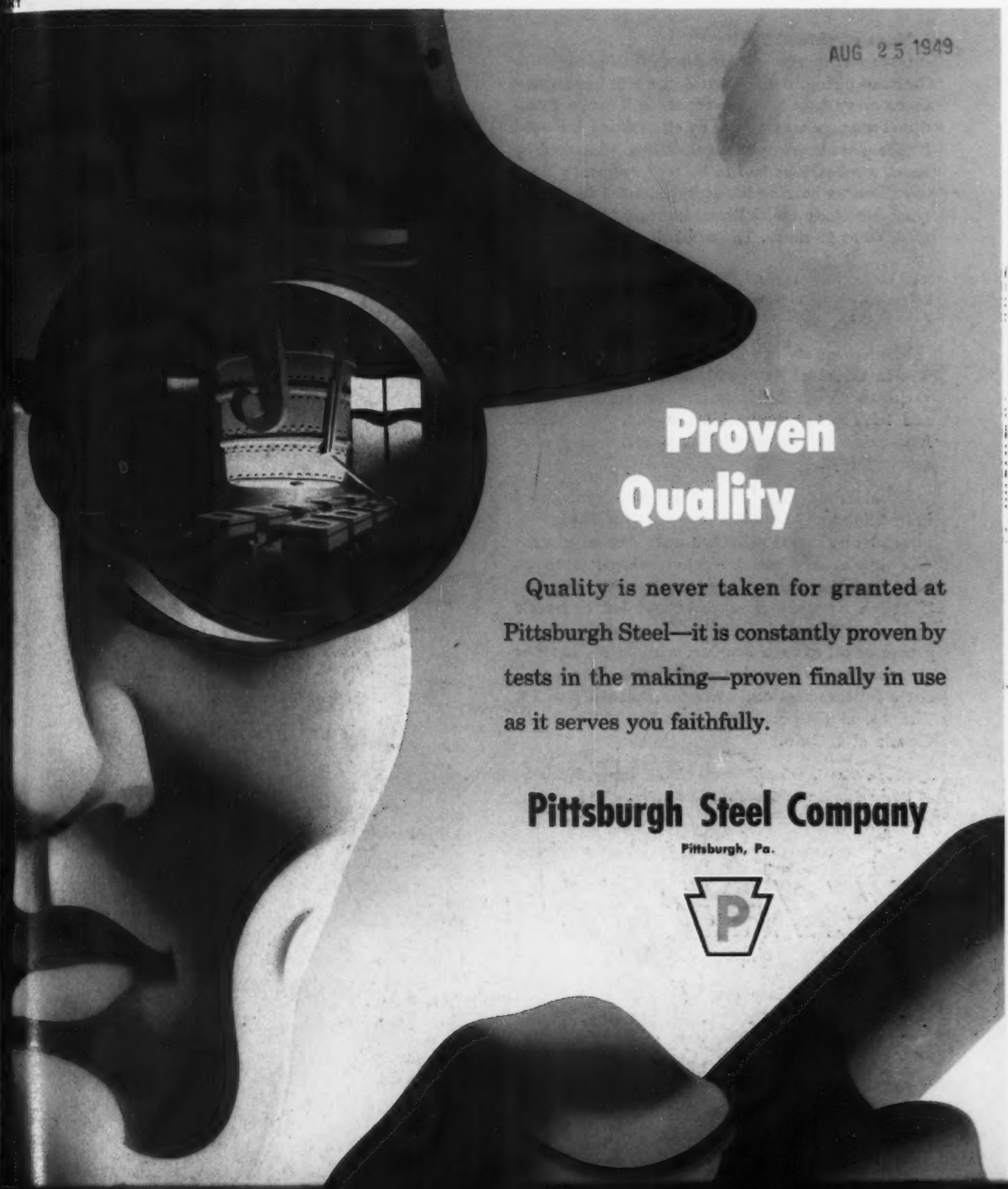
The
IRON AGE

...tents p. 2 THE NATIONAL METALWORKING WEEKLY August 25, 1949

AUG 25 1949



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Pittsburgh Steel Company

Pittsburgh, Pa.

BY ELIMINATING shutdowns formerly required for hand oiling and bearing changes, Farval is helping to increase the output of steel.

On one large plate mill, for example, it was possible to increase output from 320 tons to 445 tons per shift by installing a Farval system to provide continuous, adequate lubrication of mill, pinion and table bearings.

Plate production upped 39% with Farval automatic lubrication

Most of this 125-ton-per-turn increase resulted from eliminating stops for hand oiling. Before Farval, the mill had to shut down every three hours to repack roll necks. Additional tonnage was gained by eliminating the need for frequent bearing changes. When lubricated by hand, top bearings had to be replaced every 2000 tons. Bottom bearing life averaged 4000 tons. Adequate lubrication with Farval increased bearing life from 48 to 55 times. The tabulation tells the story:

Bearing life in tons rolled	Top bearing —average	Bottom bearing —average
Before Farval was installed .	2,000 tons	4,000 tons
After Farval.	96,000 tons	220,000 tons

The annual savings in bearing replacement cost was in excess of $100,000. Substantial additional savings were realized in power cost, labor of oiling and lubricant consumption. In fact, the over-all lubrication costs throughout the entire mill were reduced 40%.

Farval is the original Dualine system of centralized lubrication that has proven itself in over 20 years of service. The Farval valve has only 2 moving parts —is simple, sure and foolproof, without springs, ball-checks or pinhole ports to cause trouble. Through its wide valve ports and full hydraulic operation, Farval delivers a measured charge of grease or oil to each bearing, with an indicator at every bearing to show that each valve has functioned. For a full description, write for Bulletin No. 25. The Farval Corporation, 3252 East 80th Street, Cleveland 4, Ohio.

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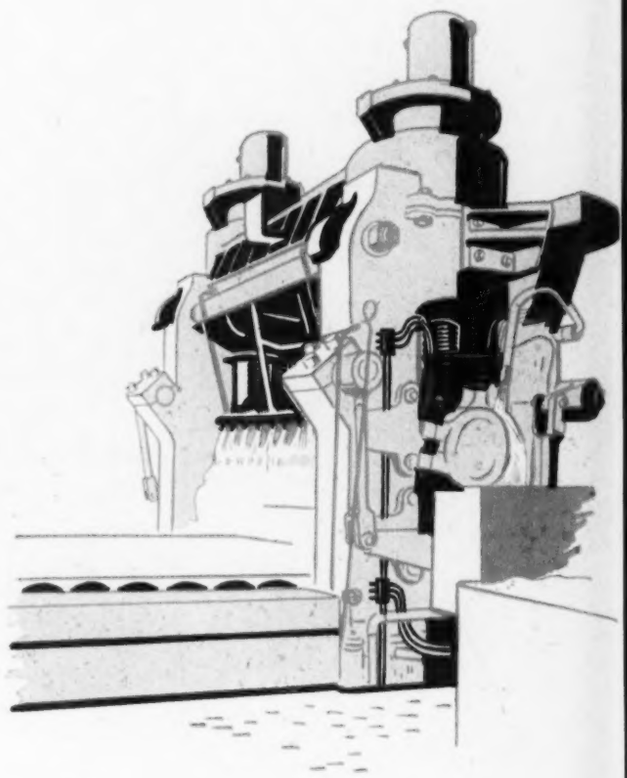
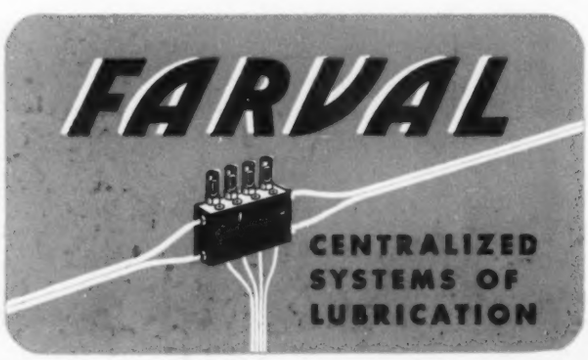


FARVAL—*Studies in Centralized Lubrication No. 86*



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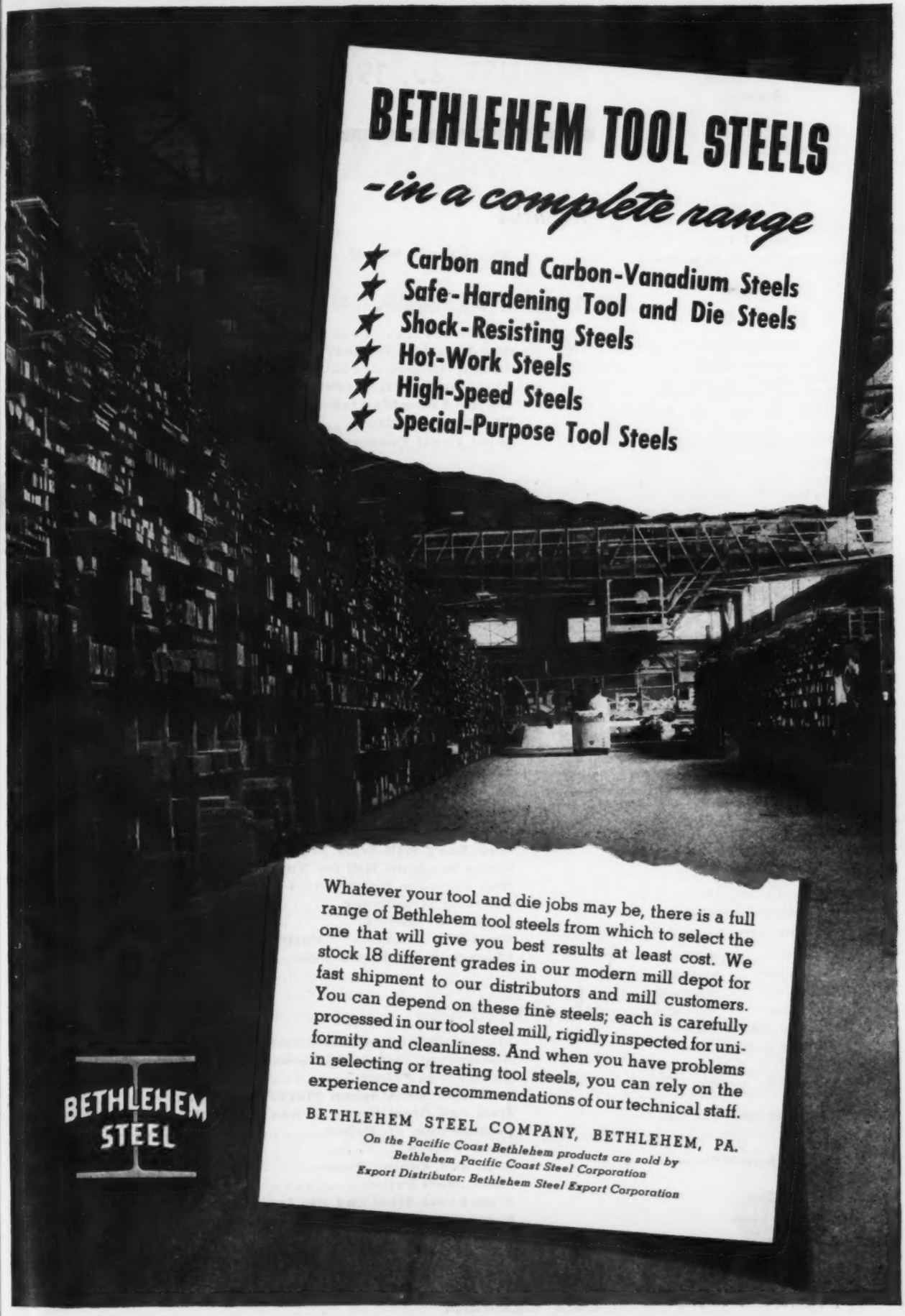
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Editorial

INDUSTRY VIEWPOINTS

The Danger Signal

WHEN the conservative Interstate Commerce Commission warned the railroads they might price themselves out of business with more rate increases, that was news. But it was also a slap on the wrist, when stacked up against the facts.

Trucks and barges have been eating heavily into carriers' business in recent years. The latest freight increase will certainly tear more business away from the rails.

Steel firms and metalworking companies are committed to help their customers find the cheapest method of transportation. That means more truck and water shipments—not rail.

Some leading steel plants are shipping from 60 to 70 pct of their finished steel by truck. Railroad arguments that trucks do not pay their way in taxes and licenses have no effect on the changeover. Shippers are sympathetic. But sympathy does not produce sales in this competitive phase of business.

When and if the bill to legalize freight absorption in steel passes, there will be more compelling reasons to seek the cheapest transportation available. The customer will demand it. The shipper will recommend it. And it will mean less and less to the railroads' corner.

Steel centers like Pittsburgh and Youngstown, which must go farther afield to keep their mills up to the national average, are seething with feeling on the latest rate increase. They must pay more for raw material. Their own prices have not risen as fast and as high as most other commodities or services. The same feeling applies to other steel firms.

But what worries Pittsburgh and Youngstown is the precarious position mills there will be in when and if the freight absorption bill is signed.

It will be more expensive for these mills to go to remote areas to compete. They might not be able to absorb the freight and still make a profit. If that happens operations will drop. So will profits. And so will the business activity in the cities faced with this problem.

Higher coal costs, certainly of bigger steel labor costs and now a higher freight rate, will push steelmaking costs up when they ought to be going down. A steel price rise is not the answer. Other means of transportation may help. They will be tried—to the railroads' disadvantage.

The nation's rail carriers should go slow in the future on rate increase pleas. But more important, now is the time for them to study, check and revise antiquated rate structures. This could help industrial centers, including steel towns, ship far and wide and still protect investments and customers.

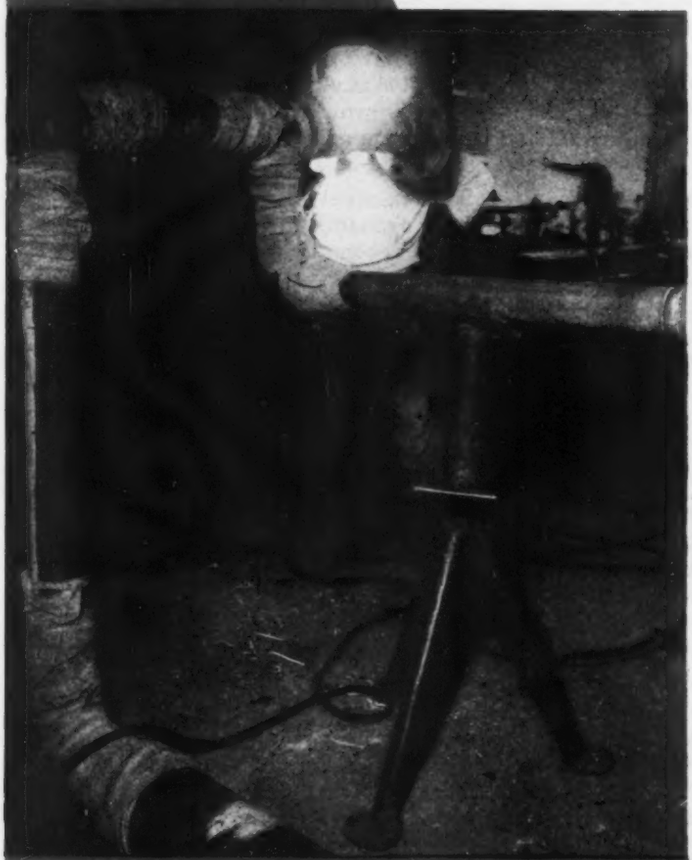
Now is the time for the rails to stop, look and listen—and then do something.

Tom C. Campbell

Editor

Here's what they're doin

New technique fo welding chrome pipe



Using General Electric welding electrode the Houston Pipe & Steel Co. has success fully used a new procedure for welding 4- chrome pipe *without* the usual time-con suming subsequent annealing procedure

According to their Chief Engineer, here' how they do it: The joint is first brough up to a 600-800 F temperature using a larg preheating tip with oxy-acetylene, and hel at that temperature during welding. Th welds are then made using G-E Type W-150 stainless electrodes. Immediately afte completing the joint, its temperature i raised to 1200-1350 F, it is wrapped in as bestos tape, and then cooled to roo temperature.

Contrary to popular belief, the wel metal *does not become brittle*. Certifie laboratory tests indicate very desirable re sults, including ultimate tensile strengt of 73,200 psi, satisfactory 180 degree roo bend, Brinnell hardness in the weld of 2 and in the pipe of 174.

"We used this procedure throughout the pr duction of the chrome pipe," states the Chi Engineer, "and the lot was completed satisfa torily, quickly, and inexpensively."

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NEWSFRONT

NEWS, METHODS AND PRODUCT FORECAST

► By Sept. 1 cumulative rail freight rate increases alone during the past 3 years will have added approximately $3.50 to the cost of making a ton of finished steel.

► Some steel people now think Phil Murray's decision to sign non-communist affidavits reflects union optimism that steel fact finding board recommendations will be acceptable to the union--putting him in shape to go before NLRB should steelmakers balk at board recommendations on pensions.

Steel officials' vim and vigor at board hearings is in marked contrast to semi-defeatist attitude in other years. Even though they think cards are stacked against them one would never know it from their fighting attitude. The public is expected to get a better line on steel people and their side of the story.

► Although Canadian mills have been doling out steel on a quota basis it is understood that fourth quarter bookings are not being restricted as to tonnage. There is still a possibility that all orders may not be filled on time.

► Some critical alloy steel components of IBM business machines that are subject to repeated shock loading in service are now shot blasted after a hard superficial case has been applied. Resulting increase in endurance limit has practically eliminated failures previously encountered.

► The coal fracas with its union-dictated 3-day week is further away from settlement than ever before. Operators are stuck with higher costs while Lewis is stymied because coal stocks remain high. The government may get into it yet.

► More than one steel executive is predicting a 65 pct operating rate this year. Many look for a fall in orders in November or December. Under today's conditions 65 pct operations isn't pessimistic for December because it is a seasonal pattern. Inflationary factors are the big question mark. But 65 pct operation today means a million tons more ingot output monthly than it did in 1937.

► Experiments recently conducted in Sweden with the Asea induction stirrer reveal a reduction of 10 to 15 pct in arc furnace total melt time. Increase in the effective surface area of the bath permits use of a deeper bath and has resulted in an annual production increase of 20 pct. The stirrer is said to be particularly suitable for quick homogenization of high alloy melts.

► Steel fabricators are in the best position in years to resist any general wage pattern that may be agreed to by basic steelmakers. The easier labor market means that fabricators won't have to compete as intensively as in the past for desirable workers. Some fabricators already have better base wage scales than basic producers.

► Steel companies will put up a stiff fight for insurance on a contributory basis on the theory that employee participation is essential to forestall a complete welfare state.

► The change in the automobile market is shown by the rate at which used car sales are climbing in relation to new car sales. In January there were 43 trade-ins for every 100 new car sales. Latest figures show 61 trade-ins per 100 new cars sold and automotive people are predicting that the ratio will hit 83 pct by the end of the year.

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The Iron Age SUMMARY

IRON AND STEEL INDUSTRY TRENDS

THE better tone in the steel market is still here this week. It looks as though it would last for many more weeks to come, barring strikes. A lot of steel people are surprised at the upturn, even though it has been moderate.

Steel salesmen, who a few months ago were offering customers prompt shipment, must now deliver on their promises. In the past few weeks this has been getting harder to do because new business has been heavy enough to stretch many delivery dates into October or November.

Some segments of the metalworking industry have experienced a revival of confidence. Purchasing agents are back to normal forward buying in most lines. In Chicago, which for the past several months has been the nation's largest steel producing area, mill schedules are generally filled through September, some products are booked solidly through October and one large mill has no cold-rolled sheet space open until December.

Current Buying Not Strike Hedging

For the time being, purchasing agents are not going to take any more chances on letting inventories run as low as they were a month ago. Not for some time. Many of them ordered in a hurry when the steel strike threat loomed. They bought as a hedge and then took stock of their steel supplies. What they found scared many. Not enough inventory to match incoming order volume.

Buying for October and November delivery is not strike hedging—except for those few who figure they'll have a better chance for quick shipment following a possible strike if their orders are on the books now. This is not likely to work. Most buying now is based on business confidence rather than strike fears.

Not all segments of the metalworking industry are sure of the future. The Administration's policy of not letting the right hand know what the left is doing—of simultaneously attacking inflation and deflation—is disturbing industrialists. On the optimistic side are the appliance makers. Exactly opposite to them are the railroads. Between the two there is still some uncertainty.

Although appliance production is better in every item from hot water heaters to gas stoves, the boom is in refrigerators. Many of the big refrigerator manufacturers are now coming back to capacity production. This has not only helped sales of slow steel items such as electrical sheets, but it has put a little life into demand for electric motors, copper tubing and all the other items that go into this product.

Railroads Cancel Steel Orders

The railroads generally don't share the optimism of the automobile and appliance people. Last week several roads held up orders for substantial tonnages of rails and track supplies scheduled for fourth quarter shipment. For one thing they are worried about the cost of the shorter work week beginning Sept. 1.

From the standpoint of steel traffic they have cause to worry too. The rate increase to take effect Sept. 1 will add an average of 25¢ a ton to the consumer's steel bill if he gets it by rail. Rail freight increases during the past 3 years have added about $3.50 to the cost of making a ton of finished steel. About $2.50 of this has been passed on to the consumer in the form of higher steel prices. On top of this the average railroad freight bill on steel is about $4.00 a ton higher than it was in June 1946.

Steel Recommendations May Be Late

There is a good chance of a postponement in the date by which the steel fact-finding report is due. The hearings have lasted longer than was originally planned and the board can hardly make recommendations within a few days of the end of the hearings. A 2-week postponement is believed to be the least that will be asked. The strike deadline would then have to be put off too.

Continuing the climb begun in July, steel ingot operations have again advanced. This week's rate of 85 pct of rated capacity is 1.5 points above last week's figure. Scrap prices also moved up again in several markets.

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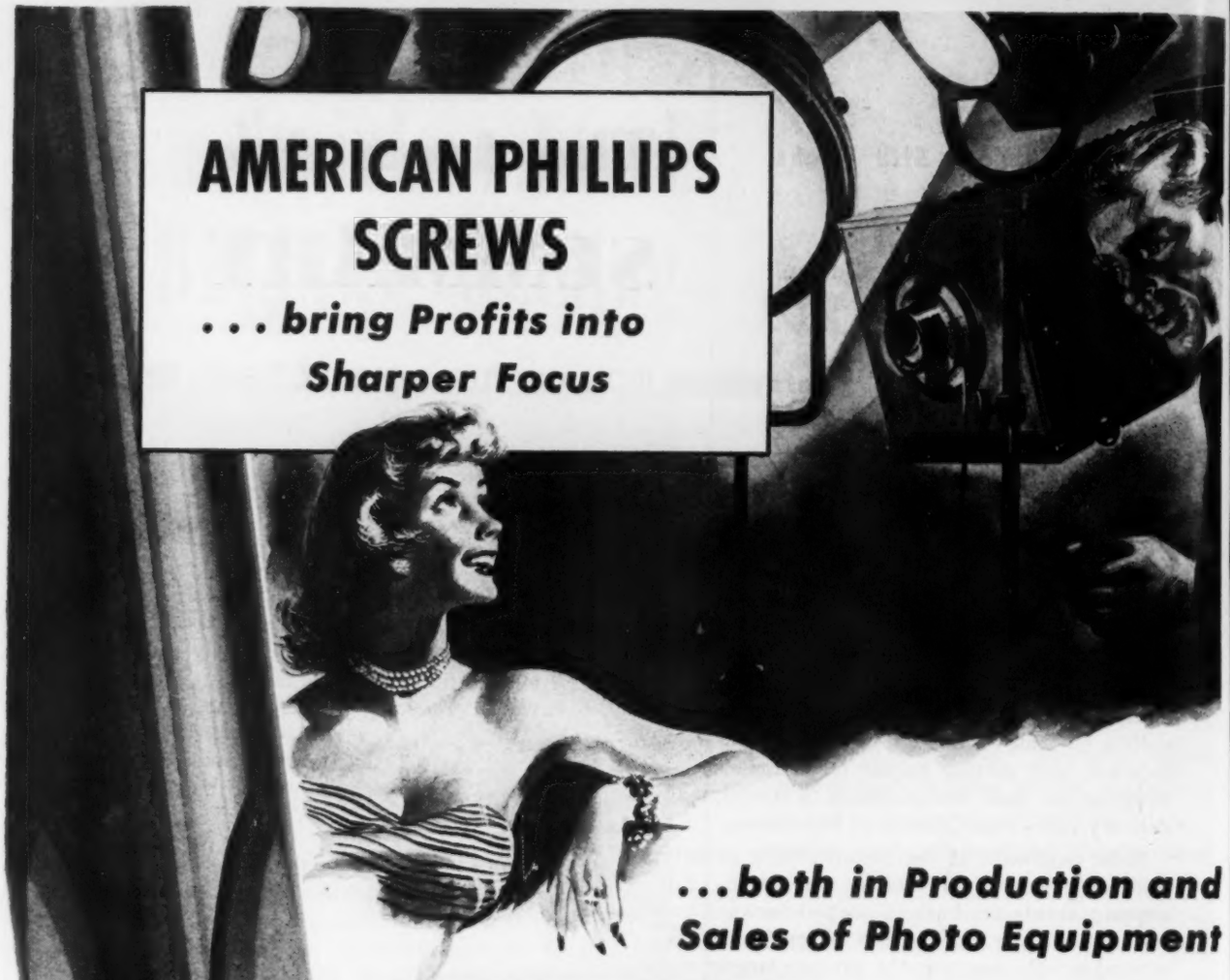
. . . bring Profits into Sharper Focus



. . . both in Production and Sales of Photo Equipment

SHARP FOCUS ON COST-CONTROL: Lights, cameras, and other tools of the glamorizing trade are liberally studded with that modern quality-mark — the universal crossed recess of American Phillips Screws. Makers of this costly photographic equipment can't afford rejects or refinishing . . . and they can't afford slow, old-fashioned assembly with slotted screws. They find . . . as so many cost-conscious manufacturers in *all* lines have found . . . *that American Phillips Screws always cost least to use.* For time-savings alone run as high as 50%!

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Fatigue Cracks

By *Charles T. Post*

Hold Your Coffee

A release from the Government's Civil Aeronautics Administration would have you know that:

"Thousands of farmers have found the airplane a useful 'tool' in the conduct of farm operations, and they have learned also how much fun it is to use the airplane in social activities such as Flying Breakfasts . . ."

These, we suppose, can be held only in rough weather. An egg in the eye counts ten points; corn flakes in the lap, three; and a shower of coffee, one. Making the green-faced passenger reach for the little container under the seat and allowing the entire breakfast to fly at one time scores one hundred.

Not our idea of fun, though.

Cooler

Harold Edison Blizzard, Detroit, Mich., was arrested today 5:56 a. m., on a charge of operating a motor vehicle while under the influence of intoxicants filed by Patrolman Donald Clinker."

—Fostoria, O., Times, July 16

"A copy writer missed a chance with this one," reports reader C. J. Koester. "For instance: ANTI-FREEZE PUTS BLIZZARD IN THE COOLER or ALCOHOL CLINKS BLIZZARD."

The possibilities are unlimited. But there's something even more remarkable. Bars are often filed to get out of jail, but who ever heard of what goes over bars being filed to get into jail?

Super Ship

Reader Charles C. Finn, the aptronym expert, varies his tack by sending a news item describing "a new type of vessel that may revive the almost extinct coastwise lumber trade. The vessel is a converted wartime landing craft . . . . (and) recently hauled 609,000 tons of lumber from Coos Bay, Ore., to Long Beach, Calif., in 62 hours."

Converted landing craft? That, son, is the Navy's secret super carrier operating under wraps.

Brodie

An unidentified New Britain reader calls attention to a recent typographical error in this department.

"It's nice to see your f.f.j. like all f.f.'s make an error once in a while, if only slightly," he says.

That's why we did it. Anything to keep the readers happy.

World Rivalry

According to Newsfront, construction of a proposed 60,000-ton press for the Air Force has been deferred.

"The big press was proposed to top the capacity of one captured in Germany by the Russians and now reported to be operating in a Soviet aircraft factory," the item explained.

If they have a 50,000 ton press, we'll build a 70,000 tonner. Then they build an 80,000 ton job and we'll come back with a 100,000 ton monster. Then they'll build —. By the way, has anyone figured out what we're going to use these big presses for?

Turn to Page 131

Putting Air to Work!

• Sailing vessels represent one of the oldest and most romantic methods of putting air to work. Long before the Christian era seamen were setting sails to harness the tradewinds. And still today, countless vessels utilize one of nature's most power-laden forces, the air currents, to drive them on their way.

Putting air to more controlled and even greater productive work has been a specialty of The DeVilbiss Company for more than 60 years. Beginning with the ingenious harnessing of air to atomize liquids in the form of a spray, DeVilbiss has steadily perfected and improved spray equipment and methods to their point of great productivity and paramount efficiency which we know today. It is the knowledge and experience which comes from such pioneering that makes DeVilbiss Equipment widely used around the world and throughout all industry.

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W. H. WIEWEL, vice-president in charge of sales, Crucible Steel Co. of America.

MACK C. LAKE, consulting engineer, Oliver Iron Mining Co. and other U. S. Steel subsidiaries.

CHARLES L. JACOBSON, president, Chrysler Motors Parts Corp.

Walter H. Wiewel has been elected vice-president in charge of sales of CRUCIBLE STEEL CO. OF AMERICA, New York. Mr. Wiewel became associated with Crucible when Trent Tube Co. of East Troy, Wis., of which he remains president, was acquired as a wholly-owned subsidiary in 1948. **R. S. Poister,** vice-president and a director of Crucible, is now in charge of all manufacturing operations. **M. E. Cummings** has been appointed assistant vice-president in the operations department. He was assistant to the president in New York since 1945. With the appointment of Mr. Wiewel, two shifts in sales posts have occurred. **William E. Pennington** becomes Eastern Sales manager, continuing in New York, where he has headed the stainless steel activities of the company. **John S. Billingsley** becomes Central Sales manager, with headquarters in Pittsburgh where he was made branch manager in 1940.

Mack C. Lake has been appointed consulting engineer exclusively for the OLIVER IRON MINING CO. and other U. S. STEEL CORP. subsidiaries. In his new capacity, Mr. Lake will deal largely with the company's ore developments in foreign fields. During the past several years, he has been closely associated with the Hanna company's Labrador iron ore exploration.

F. B. Law has been appointed assistant to the manager of manufacturing, Aeronautic & Ordinance Systems Divs., GENERAL ELECTRIC CO., Schenectady. **M. E. Keenan** was named to succeed Mr. Law as plant manager of the divisions' Burlington, Vt., facilities. Mr. Law joined GE the same year he was graduated from Georgia School of Technology and has held many positions with the firm. Mr. Keenan joined the company's Turbine Divs. in 1923 and has served in several capacities through the years.

Charles L. Jacobson has been named president of CHRYSLER MOTORS PARTS CORP., Detroit, succeeding **F. C. Bahr,** who died recently. Mr. Jacobson has been assistant to the general manager in charge of subsidiary operations. He was formerly associated with Ford Motor Co. and Wills-St. Clair Co., Marysville, Mich.

Roy T. Hurley, director of manufacturing for the Ford Motor Co., Dearborn, Mich., has been named president of CURTISS-WRIGHT CORP., New York, effective Sept. 1. Till now he has been in charge of metal processing at Ford. He was formerly associated with Bendix Aviation Corp., Detroit.

John E. Stukel Jr., former assistant professor at Carnegie Institute of Technology, has joined the operating department of the YOUNGSTOWN SHEET & TUBE CO., Youngstown, as a development engineer.

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FRANK M. MASON, JR., director of engineering, Fairbanks, Morse & Co.

J. H. REITZ, manager, Northern Coal Mine District, Republic Steel Corp.

HAROLD Q. NOACK, assistant to vice-president in charge of sales, Columbia Steel Co.

Harold Q. Noack was made assistant to the vice-president in charge of sales of COLUMBIA STEEL CO., San Francisco. Mr. Noack resigned as Pacific Coast manager of Phelps Dodge Copper Products Corp. to accept the new position. He will handle assignments in connection with Columbia's customer relations program.

Fred T. Wiggins has been elected vice-president and assistant general sales manager of UNIVERSAL ATLAS CEMENT CO., New York, a U. S. STEEL CORP. subsidiary. He joined the Company in 1926 at Birmingham and progressively served in the New York and Western Region sales divisions. **Henry P. Reid,** chief engineer, has been elected to the newly created office of vice-president—engineering. He has worked for the Company 25 years, in the capacities of special engineer, operating engineer and assistant to president, until his recent promotion.

Frank M. Mason, Jr. is now director of engineering at FAIRBANKS, MORSE & CO., Chicago. For several years he acted as manager of the Research Div. He joined the company in 1922, entering the engineering department of their Indianapolis plant.

Hugo T. Wilder has been made manager of the marketing division sales department of ALUMINUM CO. OF AMERICA, Pittsburgh. Mr. Wilder has been with the company since 1919. In 1946 he assumed the duties of warehouse manager including supervision of the company's nationwide distribution system.

Earle S. MacPherson has been promoted from executive engineer on design and development to chief engineer of all company products by FORD MOTOR CO. **John Oswald** is executive engineer for styling and body engineering. The activities of **George W. Walker,** consulting stylist, will be increased in connection with the styling program for forthcoming Ford products.

Howard Davies, field engineer of the WARNER & SWASEY CO., Cleveland, has been assigned to the Syracuse district sales office. He has been with the company since 1927.

Harold F. Ebken, formerly procurement manager for the Missouri-Illinois plant of the GAS & COKE DIVISION, KOPPERS CO., Pittsburgh, has been named personnel manager for the Division. **M. W. Gaylord,** formerly plant engineer for the Division's St. Paul plant, has been appointed production manager.

J. H. Reitz, formerly assistant manager of the Northern Coal Mine District, REPUBLIC STEEL CORP., Uniontown, Pa., has been appointed manager of the district following the resignation of **James L. Hamilton.** Mr. Reitz became associated with Republic when they acquired the Indianola mine.

Edgar F. Wait has been named assistant plant manager; **C. F. Hancock,** resident comptroller; **Clifford E. Bernard,** general superintendent, trim, paint and artificial leather manufacturing and **Clarence W. Brown,** manager of works standards of the Highland Park operations of FORD MOTOR CO., Dearborn, Mich. Mr. Wait was formerly associated with Firestone Tire & Rubber Co. and joined Ford in 1936. Mr. Hancock was previously assistant comptroller of the Cleveland plant, Fisher Body Div., General Motors Corp. Mr. Bernard was assistant superintendent of flight and final assembly inspection at Willow Run during World War II. Mr. Brown was engaged in bomber time study at Highland Park and later served in the standards analysis department.

C. Stuart Haagensen has been made assistant manager of ALLIS-CHALMERS, Milwaukee, labor relations department and secretary of the firm's negotiating committee.

Eugene A. Johnson has been placed in charge of sales in the Pittsburgh area for FORT DUQUESNE STEEL CO., Pittsburgh. He had been associated with the affiliated Hamilton Steel Co., Cleveland, since 1940.

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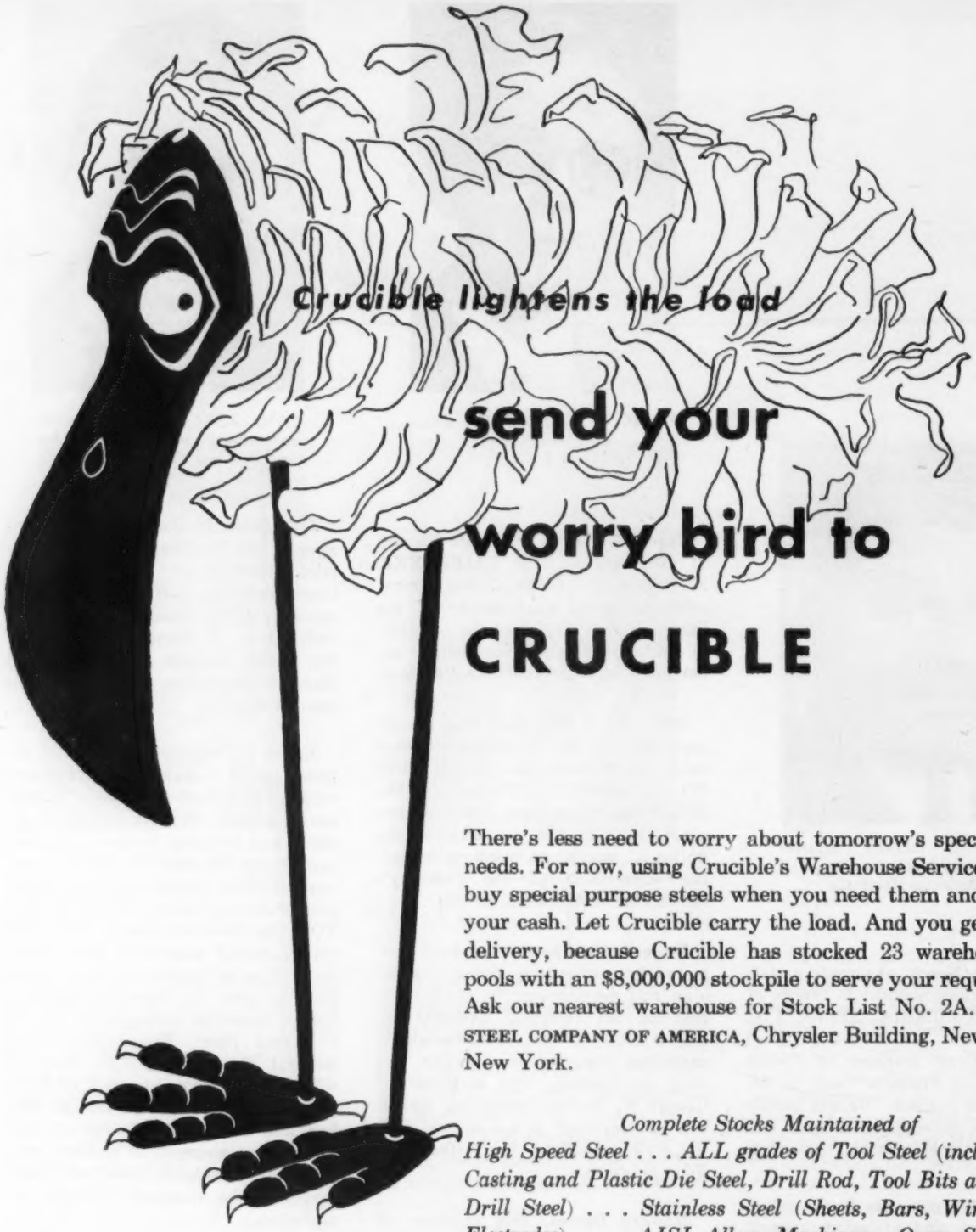

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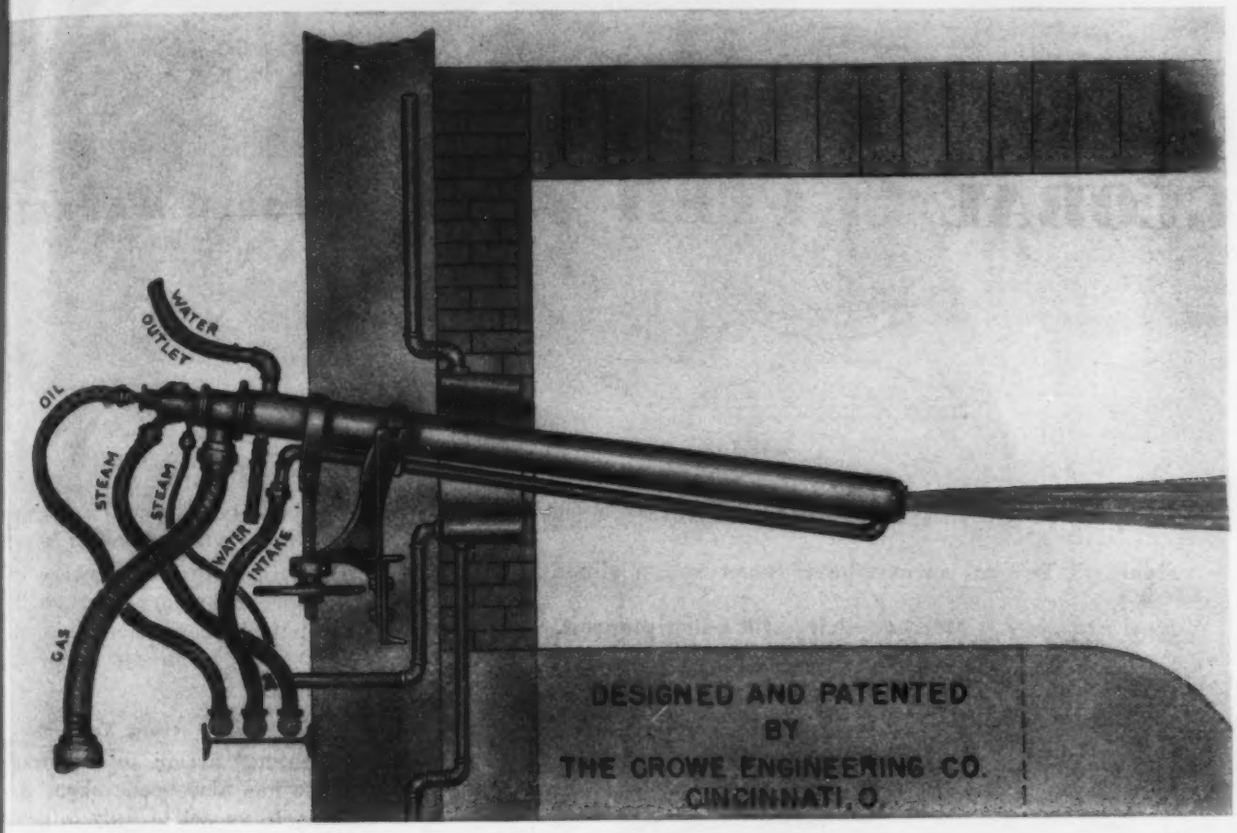

For many years The Crowe Engineering Company has been developing Artillery Burners for open hearth furnaces. A study of furnace characteristics has resulted in burners made to produce more steel with less fuel and less cost per ingot ton.

Erosion of brickwork has been materially reduced and roof life increased by designing Crowe Artillery Burners for the individual furnace in which they are used. Crowe Artillery Burners do not require protective brickwork. The cost of maintaining doghouses or any other protective brickwork has been entirely eliminated. The elimination of doghouses not only reduces erosion of brickwork, but prevents turbulence in the end of furnace, thereby reducing the burning out of end walls.

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THE CROWE ENGINEERING COMPANY

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GLOBAL LETTER

REVIEW OF WORLD MARKETS

Competition growing keener in world export markets for steel . . . Several nations have taken action aimed to aid steel exports . . . More capacity still being planned.

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Paris—Easing of demand and increasing competition on world markets are beginning to raise new problems for European steel producing countries. Export prices have been on the declining side since the beginning of the year. Leading exporting countries which heretofore had been able to secure very profitable prices on foreign markets are now granting more and more concessions on their quotations.

At the same time they are encountering higher production costs. This makes the prospect of price reductions in the domestic markets very remote. Since the first of the year steel prices have been raised in several European countries by eliminating subsidies or adjusting to costs. At present there are no indications that this trend will be reversed in the near future.

Belgian Boost Rumored

With decreasing export prices and increasing home prices, some exporters are already anticipating the time when they will have to sell at the home price level in order to maintain their position.

According to rumors in the trade, domestic prices of Belgian steel are due for a healthy boost in the near future. These prices have been held at a low level compared with costs because they have been offset by highly profitable export business.

Austrian home prices were advanced, effective July 1. The increase in base prices averaged 24 pct. Extras which hadn't been changed since 1945 were tripled. These increases are creating serious problems for consumers.

Austria Helps Exports

Domestic steel prices in Germany are at a very unrealistic level. In still other countries costs are not declining and perplexing labor problems remain unsolved. Money has to be found to finance modernization plans before lower costs can be expected, most in the trade believe.

The most far-reaching price measures so far are those taken in Austria to help indirect exports. This action is based on an agreement between the steel industry and the fabricating industries working for export. Steel orders booked after July 1, to be delivered after Sept. 1, and to be used for making export products, will benefit by a reduction of 15 to 18 pct on base prices. Extras on these orders will be slashed 50 pct.

On certain products where extras represent a large part of the price paid by consumers this will undoubtedly mean an important advantage.

French Take Action, Too

In France action to encourage exports has also been taken. According to an act of July 5, goods delivered to fabricators working for export are exempt from the production tax of 12.5 pct. This exemption is limited by the volume of exports during the previous year.

These are a few of the moves which have already been taken to meet growing competition in the export market. Others can be expected as the competitive pinch grows tighter.

Steel Production to Jump In Most European Countries

London—Estimated 1952-53 production of crude steel in O.E.E.C. countries totals some 57.5 million tons. This is an increase of 58 pct (excluding German production) over the 1935-38 figures, according to an E.R.P. document issued here Aug. 5.

Including western German production, which is limited by international agreement, the total increase will be 30 pct over 1935-38. The output a year or two later when existing development plans are complete should reach about 59 million tons.

The planned increase in iron

(Turn to page 138)

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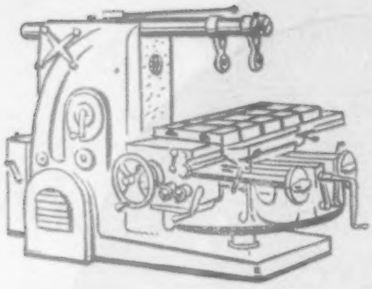

MACHINE TOOL High Spots

SALES, INQUIRIES AND PRODUCTION

by William A. Lloyd

Machine tool pick-up still on paper . . . Some orders noted from Detroit . . . Spread is still thin.

Cleveland—Machine tool builders and distributers were getting a few orders for their sales efforts this week, notably in Detroit, but the spread is thin and the promised pick-up is still on paper.

Business is spotty in most major sales sectors. Some companies are reporting a slight increase in new firm orders, but a definite upward trend has not yet materialized.

Industry sources, however, are standing firm in their forecast of a revival in the machine tool business this fall, probably during the September-October period. This revival will scarcely be of boom proportions. But the volume of current quotations is the source of considerable optimism.

The predicted pick-up in orders is not pegged exclusively to the automotive and home appliance industries. Contract tool and die shops, also an important source of machine tool orders, reported June shipments and orders (latest available) about equal to May and that backlog is up for the second consecutive month. Backlog is materially lower than last year at this time, but the contract tool and die industry could easily prove to be the difference between good and bad business this fall, particularly for some machine tool builders in the east.

Growing Optimism In Detroit

In Detroit there is a growing conviction that the machine tool tempo will be stepped up appreciably in the very near future.

Important programs are still under consideration and there has been an increased number of placements during the past week, according to trade sources.

During the past fortnight some buying has been reported by Chrysler, Lynch Road, Packard and Cadillac. There is a considerable amount of Ford activity, including the new press metal plant at Buffalo and a new die-casting program. Quotations have also been requested on important equipment for Ford's tool and die room.

Sources close to Ford are speculating about the effects on the company's future buying policy that will result from the acceptance of the presidency of Curtiss Wright Corp. by Roy T. Hurley, Ford's director of manufacturing. Mr. Hurley was particularly receptive to new ideas about tooling and many of the advances made by Ford during the postwar period have been attributed directly to his aggressive leadership in metal processing.

Chrysler Brake Business

Another source of optimism here is the announcement by Chrysler this week of the first self-energizing disc-type hydraulic brake. Some equipment has already been purchased for this brake and additional orders are anticipated. Should this development carry through the industry, as many think it will, a new opportunity for tooling will be developed in the industry, according to trade sources.

The report has persisted here that Kaiser-Frazer is going to take important steps to improve its present engine and there are indications that this activity is now being stepped up at Willow Run. As has been mentioned before in this column, it will not be surprising if a contract is signed by K-F and Willys Overland for a new engine, possibly for a car to compete with Ford, Chevrolet and Plymouth.

Meanwhile, automatic transmission activity is continuing. Borg-Warner continues to be active and there are reports this week that Nash may take one of the several Borg-Warner designs.

It has been reported that Ford transmission parts will be transferred from the Detroit gear plant and that the original tooling for this plant calling for 65 units per hr. may be doubled.

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This is a typical list of manufacturers who, since the end of the war, have purchased Sunbeam STEWART FURNACES to help reduce costs and keep themselves competitive

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Allbright-Nell Co.
Allen Bradley Co.
Allen Mfg. Co.
Allis-Chalmers Mfg. Co.
Altorfer Bros. Co.
Aluminum Co. of America
American Air-Filter Co. Inc.
American Airlines Inc.
American Ball Bearing Corp.
American Brake Shoe Co.
American Brush Corp.
American Can Co.
American Cast Iron Pipe Co.
American Chain & Cable Co. Inc.
American Electric Fusion Corp.
American Hardware
Corbin Cabinet Lock Div.
American Hollow Boring Co.
American Instrument Co., Inc.
American Meter Co., Inc.
American Optical Co.
American Phenolic Corp.
Anderson-Carlson Mfg. Co
Anderson Co.
D. L. Anderson Co., Inc.
Apex Smelting Co.
Armstrong Cork Co.
Art-Craft Optical Co., Inc.
Atchison, Topeka & Santa Fe Ry. Co.
Auto Spec. Mfg. Co.
Automatic Electric Co.
Automatic Gas Co. of Columbus, Inc.

B Badger Tool & Eng. Co.
B. A. Ballon & Co., Inc.
The Bassick Co.
C. J. Bates & Sons
Bauer & Black Div., Kendall Co.
Bayuk Cigars, Inc.
Beatrice Steel Tank Mfg. Co.
Bell & Gossett Co.
Bell & Howell Co.
Belle City Mfg. Co. Inc.
Bendix Aviation Corp.
L. A. Benson Co. Inc.
Bernardin Bottle Cap Co. Inc.
Blizzard Mfg. Co.
Blue Ridge Pressure Castings
Bolens Products Co.
Bonney Forge Tool Works
Boston Wire Stitcher Co.
James H. Boye Mfg. Co.
Brasco Mfg. Co.
Chas. D. Briddell, Inc.
Bristol Co.
Broderick Co.
D. S. Brown Co.
Bucyrus-Erie Co.
Edw. G. Budd Co.
Buick Oldsmobile Pontiac Assembly Div., General Motors Corp.
Burgess-Norton Mfg. Co.
Burndy Eng. Co. Inc.

C Caine Steel Co.
Cameron Mfg. Corp.
Carbo Tool & Die Co.
Carnegie-Illinois Steel Corp.
Certain-Teed Prod. Corp.
W. M. Chace Co.
Chain Belt Co.
Chamberlain Corp.
Cherry-Burrell Corp.
Chicago Auto Spring Co.
Chicago & North Western Ry. Co.
Chicago Pneumatic Tool Co.
Chicago Rawhide Mfg. Co.
Chicago, Rock Island & Pacific RR Co.
Chicago Screw Co.
Chicago, South Shore & South Bend RR
Chopie Tool & Die Co.
Chrysler Corp.
W. M. Cissell Mfg. Co.
Clayson-Forenz Co.
Clifton Conduit Co.
Colgate Mfg. Corp.
Collyer Insulated Wire Co., Inc.
Corn Products Refining Co.
Cummins Business Machines
Cutler-Hammer, Inc.

D Davis & Furber Mach. Co.
Day Brite Lighting, Inc.
Deere & Co.
Detroit Gear Div., Borg-Warner Corp.
Detroit Stamping Co.
Diamond Expansion Bolt Co., Inc.
Doehler-Jarvis Corp.
Dole Valve Co.
E. I. DuPont de Nemours & Co., Inc.
Dynamatic Corp.

E Eagle Pencil Co. Inc.
Eastman Machine Co.
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Ehlert Tool Eng. Co.
Electric Storage Battery Co.
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Eveready Tool Co.
Eversharp, Inc.

F Fafnir Bearing Co.
Ferrara Spring & Parts Co., Inc.
Fischer & Porter Co.
Michael Flynn Mfg. Co.
Foreman Mfg. Co.
Frazer & Jones Co.

G General Cable Corp.
General Electric Co.
General Motors Corp.
Electro-Motive Div.,
Frigidaire Div.
General Tool & Die Corp.
Geroter May Corp.
Gibson Refrigerator Co.
Girard Mfg. Co.
Gisholt Machine Co.
Great Lakes Spring Corp.
Green Bay Drop Forge Co.

H Hammond Brass Works
Harrington & King Perforating Co.
Hartford Machine Screw Co.
J. F. Helmhold & Bro.
Hi Level Screw Prod. Co.
High Speed Hammer Co. Inc.
Hotpoint, Inc.
Houdaille-Hershey Corp.
General Spring Bumper Div.
Huntington Div.
Oakes North Chicago Div.
M. D. Hubbard Spring Co.
B. H. Hubbert & Son, Inc.
Hummer Mfg. Co.
Hy-Pro Tool Co., Inc.
Hydraulic Press Mfg. Co.

I- Illinois Tool Works
International Projector Corp.
J International Tool & Gauge Co.
James Mfg. Co.
Johnston Lawn Mower Corp.
Jones & Laughlin Steel Corp.
A. D. Joslin Mfg. Co.

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Klein Mfg. Co.
Kraeuter & Co., Inc.
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Northern Electric Co.
Northern Pacific Railway Co.
Northwest Metal Prod. Inc.

O- Ohio Brass Co.
Oliver Corp.
P Pacific States C. I. Pipe Co.
Paramount Wedding Ring Co.
Pearlduck, Inc.
Peerless Roll Leaf Co. Inc
Penn Rivet & Machine Co.
Petersen Mfg. Co.
Phelps Dodge Corp.
Philco Corp.
Pick Mfg. Co.
H. K. Porter Co.
American-Fort Pitt Spring Div.
Precision Mfg. Co
Progressive Mfg. Co.

R Radio Corp. of America
R. J. Randel Tool Co.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc.
F. B. Redington Co.
W. H. Reisner Mfg. Co. Inc.
Reliable Electric Co.
Remington Rand, Inc.
Republic Steel Corp.
Rewelec Mfg. Co.
Rheem Mfg. Co.
Richardson Scale Co.
Richmond, Fredericksburg & Potomac RR Co.
Roy E. Roth Co.
Wm. & Harvey Rowland, Inc.
Royal Typewriter Co.
Ruud Mfg. Co.
Jos. T. Ryerson, Inc.

S Safety Socket Screw Co
Sager Lock Works
Schultz Die Casting Co.
Scovill Mfg. Co.
Seneca Wire & Mfg. Co.
Servel, Inc.
W. A. Shaeffer Pen Co.
Shepard Niles Crane & Hoist Corp
R. H. Sheppard Co. Inc.
A. O. Smith Corp.
Solomon Sokoloff
South Bend Lathe Works
Sperti Faraday, Inc.
St. Joe Machines, Inc.
St. Louis Southwestern Ry. Co.
St. Louis Steel Castings Co.
Staatsburg Ice Tool Works
Standard Dredging Corp.
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Standard Steel Spring Co.
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T Tait Mfg. Co.
Tennessee Coal, Iron & R. R. Co.
Texas Co.
Thomas & Skinner Steel Products Co.
Tillotson Mfg. Co.
Timken Roller Bearing Co.
Tobin Tool & Die Co.
Townsend Co.
Triangle Auto Spring Corp.
Triplett Electrical Instrument Co.
Tube Turns, Inc.

U- U. S. Cloth Cutting Mach. Co.
U. S. Metals Products
V United-Carr Fastener Corp.
Universal Chain Co. Inc.
Universal Oil-Seal Co.
Ushco Mfg. Co., Inc.
Vince Forging & Mfg. Co.
Vollrath Non-Ferrous Metal Foundry

W Waterloo, Cedar Falls & Northern RR
Watson Elevator Co. Inc.
Waukesha Motor Co.
Weaver Mfg. Co.
Webster Electric Co.
Western Electric Co., Inc.
Wetmore Reamer Co.
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Power Feeds

Machine tool power feeds, either hydraulically or electrically controlled, are featured in bulletin DF-105R. Installation of these units for drilling, tapping, reaming, counterboring, milling and grinding has resulted in increased production. *Bellows Co. For more information, check No. 2 on the postcard.*

Metal Working Service

Contract services available to manufacturers of metal parts are described in 12-p. brochure. Firm's facilities provide for engineering, design, tools, presswork, finishing, fabrication and assembly. *Gilro Machine & Stamping Co. For more information, check No. 3 on the postcard.*

Ball Mills

Alloy steels for ball mill liners and grates are described in bulletin 449-ML. Charts and pictures illustrate alloy steels and irons for various impact and abrasion combinations in grinding mills in basic industries. *American Manganese Steel Div., American Brake Shoe Co. For more information, check No. 4 on the postcard.*

Induction Heaters

Bulletin No. 28 describes low frequency induction heaters for autoclaves, die nozzles, stress relieving, shrink fits and other applications. Procedures by which principles of high frequency can be applied to 60-cycle are described. *Ajax Electrothermic Corp. For more information, check No. 5 on the postcard.*

Flotation Equipment

Principles, applications and results of flotation in recovery and separation processes are discussed in bulletin No. F10-B29. Also described are flotation machinery and testing procedures. *Denver Equipment Co. For more information, check No. 6 on the postcard.*

Thrust Bearings

Catalog No. 25 describes various types of ball and roller thrust bearings. Included are list of sizes and a section on engineering data. Bearing accessories are also listed. *Gwilliam Co. For more information, check No. 7 on the postcard.*

Radiation Counters

Self-quenching radiation counter tubes are described in 8-p. bulletin. Counters, now mass produced, are designed to measure alpha, beta, gamma and X-ray radiations. *Amperex Electronic Corp. For more information, check No. 8 on the postcard.*

Hydraulic Equipment

Listed in 8-p. bulletin are hydraulic pumps, motors, valves, cylinders and controls. Applications of such equipment are illustrated, and pertinent data included. *Commercial Shearing & Stamping Co. For more information, check No. 9 on the postcard.*

Growth Resistant Iron

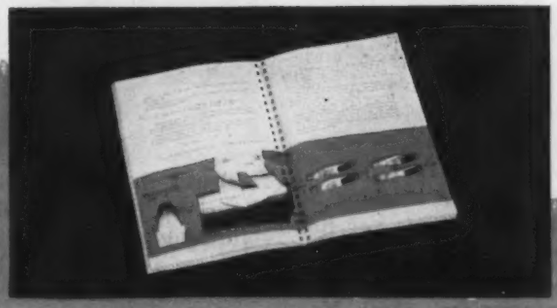
Growth resistant cast iron of the high silicon type is described in booklet. Castings made of this material have been found suitable for

Turn to page 108

get this new book

A TECHNICAL
ANALYSIS OF
FAST INDEX HOBS

"Faster Gear Production"



"Faster Gear Production" is a new 20 page booklet prepared by Illinois Tool Works. It presents a careful, thorough analysis of the advantages of Fast Index Hobs and the opportunities for exploiting the full production capacity of your present machine tools. Technical data on finishes, performance characteristics and comparative rates of production in various types of applications are discussed. You will find this specific information, based on actual experience, genuinely helpful—send for your free copy today!

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HEADQUARTERS FOR ENGINEERED CUTTING TOOLS

NEW PRODUCTION IDEAS

Continued

the die head. For thread sizes larger than 9 5/16 in. diam, an enlarged closing ring is mounted on the head to support the oversize chaser holders. The chasers used are six per set having a 30° short roughing and finishing throat. The coarsest pitch recommended in eight threads per in. The chaser holders have a diametral adjustment of approximately ⅝ in. on the larger size. *Landis Machine Co. For more information, check No.* 22 *on the postcard on p.* 33.

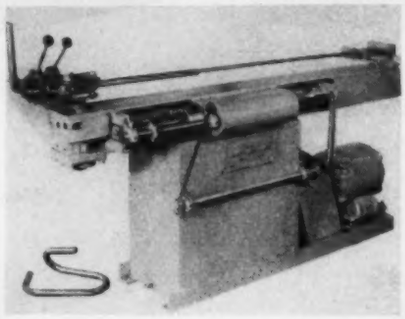
Industrial Welder

Compact design, ease of operation and reserve capacity of the new NEMA rated 200 amp ac Fleetwelder make it suited for both

job shop and industrial welding. It can handle a wide range of work in thick and thin material, using electrodes ranging from 5/64 to ¼ in. Low-current welding of thin sheets is simplified and high-current welding of heavy plate is made faster through its Arc Booster. The booster starts the arc automatically the instant the electrode touches the work on either thin or heavy material. Continuous fine current adjustment through the complete range is obtained by control handle adjustment. A dial on top of the case indicates the current setting. The unit stands 25 in. high. *Lincoln Electric Co. For more information, check No.* 23 *on the postcard on p.* 33.

Tube Bending Machine

Tubes and pipes up to 5 ft long can be handled on a new semi-automatic hydraulic bending machine,



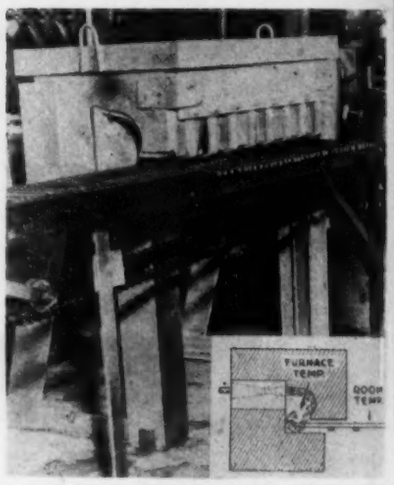
with maximum rated capacity of 1 in. OD 16 gage steel tubing, and with a maximum bending radius of 8½ in. to centerline of tube. The bender can be tooled to handle serpentine and stacked coil bends. The draw bending principle is employed, producing high quality bends without wrinkles or distortion. Operations are controlled by two toggle-operated hand clamping levers and one manual hydraulic valve control lever. An adjustable angle-of-bend turret permits instantaneous selection of any one of four preset angles of bends. The machine is rated at 100 to 400 bends per hr. The bending arm moves at a speed of 29 rpm. *Pines Engineering Co. For more information, check No.* 24 *on the postcard on p.* 33.

Weld-Timer

Faster consistent operation and more accurate sequence timing for non-synchronous resistance welders are claimed for the redesigned NEMA 3B sequence weld-timer. It also provides easy low range adjustment. The timer is enclosed in a wall-mounted sheet steel enclosure. The interior panel, with plug-in sub-assembly construction, swings out in a horizontal plane to permit ease of servicing. Setting dials are arranged for ease of time selection. The timer is designed for operations up to 450 spots per min on 20 gage steel. *Westinghouse Electric Corp. For more information, check No.* 25 *on the postcard on p.* 33.

End Heating Furnace

Ends of pieces being heated on the new Roto-Flame end heating furnace are entirely enclosed in flame. This end heating furnace is used for heating, for forging, swaging, upsetting, threading, hardening and annealing. High manifold pressures, and a small combustion chamber are outstanding features of the furnace. When in operation, the curved refractory section of the Roto-Flame becomes completely incandescent, with the radiant heat from this surface further increasing heat input. The shape of the refractory also serves



to carry the flame inward, helping keep the operator cooler and facilitating parts conveyance. The furnace is supported by a heavy structural steel frame. Fuel consumption is reported to be extremely low, and any commercially available gas can be used. *Gas Appliance Service, Inc. For more information, check No.* 26 *on the postcard on p.* 33.

Shuttle Conveyer

Flexibility of operation, maximum and uniform loading of storage space, less maintenance and greater capacity are claimed for a new trough belt shuttle conveyer

Turn to Page 110

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Since 1940, when Great Lakes Steel pioneered the application of high-tensile, low-alloy steel to cold-stamped automobile bumpers, there has been a growing trend to N-A-X HIGH-TENSILE steel in the automobile industry.

Today, every car manufacturer is using the inherent better properties of N-A-X HIGH-TENSILE steel for some part of his automobile.

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On the ASSEMBLY LINE

AUTOMOTIVE NEWS AND OPINIONS

Chrysler disc-type brakes are important forward step . . . New Studebaker uses aircraft front design motif . . . Car builders are making running changes as well as model changes.

by Walter G. Patton

Detroit—An automobile brake development nearly everyone has been expecting has come about so quietly it has caught the industry almost completely by surprise. This week, Chrysler Corp., first to use hydraulic brakes, has announced the first disc-type, self-energizing brakes. This is "the most important improvement in wheel brake design since the original introduction of hydraulic brakes," Chrysler proudly announced.

According to Chrysler engineers, the new disc brake is safer and requires less foot pressure than the present type brake. The brake is self-compensating, requiring no adjustment during the life of its bonded lining. Chrysler engineers are also claiming better cooling, 30 pct increase in lining area, greater rigidity, absence of fading and better all-around efficiency than any other type of automobile brake.

Instead of the usual curved shoe, the new Chrysler brake utilizes two flat pressure plates located inside a flat housing. When the brake is applied, these plates move apart until they come into contact with the inside flat surfaces of the rotating brake housing. The plates are flat rings to which segments of brake lining are Cyclebonded.

Between the plates and on the inside surface six steel balls are located. When the plates are rotated in a counter direction, the balls tend to push out of their sockets and move on to small ramps in the plates. This action forces the plates apart. The brakes become self-energizing, since the movement of the car accentuates the braking action once the brake pressure is applied.

Although the new Chrysler brake has been under development for months, Chrysler's latest engineering secret has hardly been discussed except in very restricted circles.

Studebaker Sports New Front

South Bend—A strikingly new frontal appearance, the same distinctive fender treatment, de-emphasis on chromium trim and new front suspension are featured in the new Studebaker models released here this week.

Designed by Raymond Loewy Associates, the same firm responsible for the style-setting postwar Studebaker, the 1950 models have the same clean lines and distinctive appearance of the earlier Studebaker offerings.

The frontal treatment reminds one immediately of the front end of a jet bomber, in which the central figure—a large chrome spinner—represents the nose of the ship and the headlights mounted in each fender suggest the jet engine openings.

Uses Less Chromium Trim

In addition to its ornamental function, the central spinner augments four direct air openings to the engine. The largest of these air passages consists of two oval-shaped honeycomb grille scoops. Above these, flanking the spinner, are smaller openings covered by trim.

In its newest model, Studebaker has minimized on chromium trim. The redesigned headlights are painted to match the body, eliminating the usual chrome frames. Except for a broad chrome strip along the side, the hood ornament and small decorative figures on

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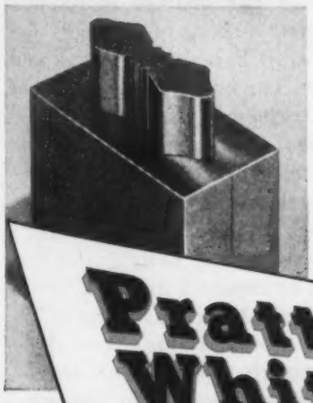
FORM-GRINDING TO NEW STANDARDS OF ACCURACY



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Operating on the pantograph principle, DIAFORM accurately traces any form from an inexpensive template at a reduction ratio of 10:1. The dressing diamond is traversed over any grinding wheel up to 1" wide x 10" diameter by very light tracer pressure to form-dress the desired contour.

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This new Bulletin tells the whole DIAFORM story, illustrating the time-saving procedure to produce an accurate split die and punch, from drawing to finish-grinding. Drop us a card for your copy.

Diaform
for low cost, precision
form-dressing of grinding wheels

ONLY THE WINGS ARE MISSING: Looking strikingly like a front view of a jet bomber, this new front end treatment of the 1950 Studebaker is expected to draw considerable attention. In addition to its ornamental contribution, the "spinner" augments four frontal openings that direct air into the engine. The largest openings are the two oval-shaped scoops with the honeycombed grille. Two additional air channels flank the spinner.

each fender, the cars have a minimum of chromium decoration.

Bumpers are heavy gage steel of the wrap-around type. Bumper supports are encased in tubular steel housings painted to match the car. Incidentally, the use of matching paint instead of chromium is also a design feature of Studebaker trucks.

Rear fenders have a long, sleek appearance. Simultaneously, this design provides space for large vertical tail lights in the trailing edge, a design feature that seems now to be well established in the industry.

Instruments Moved Forward

The steering column of two of the new models is enclosed in an oversize steel jacket. Outside door handles feature a pull-type action (rather than the push button type adopted by some of Studebaker's competitors). The instrument panel has been moved 4 in. forward.

Studebaker is offering buyers an exceptionally wide choice of upholstery, including several striking combinations of leatherette and nylon. Foam rubber cushions are standard equipment on all models except the lower priced Deluxe Champion.

In both its models, Studebaker is raising the compression ratio. The rating has been boosted from 7.0 to 1 for both engines. For high altitudes only, a 7.5 to 1 ratio is available.

In its new front self-stabilizing wheel suspension, both upper and lower arms are pivoted so that they rake to the rear about 15 deg. This has been done to "cushion the ride on rough roads," according to Studebaker engineers. Rubber insulation is used both at the top and bottom of each coil spring.

Other features of the new cars include an integral vacuum spark modified (on the Commander), new engine mounts, a redesigned frame to accommodate the springing changes, and a simplified symmetrical steering linkage, with center-point linkage on the Commander and Land Cruiser. All tires are extra low pressure type.

The new Studebaker is first and last a distinctive car. At the moment, the company is setting the fastest pace of any of the independent car manufacturers. The newest models should enable Studebaker to maintain its present momentum. And many observers will be surprised if the company fails to increase its percent of price class with the latest models. For the first 3 months, Ward's has estimated that Studebaker production accounted for 4.20 pct of all U. S. car production.

Ford Makes Running Changes

Detroit—While a great deal of publicity has been given to new model changes, the auto industry is also making a lot of running changes in its cars. For instance, during the past 18 months, Ford has made a long series of engineering changes in its truck line, mostly designed to increase flexibility or improve economy.

Included in the list to date are the adoption of air brakes for vehicles 21,500 gross, the offer of special heavy duty three-speed transmissions, the addition of dual cylinder rear brakes on some models, specification of rotating type valves in 145-hp engines, adoption of a new camshaft and solid adjustable toppets and installation of double channel frames on heavy duty trucks.

Lincoln has also made a number of important changes since its cars were introduced in June 1948.

Accessory Loading Almost Out

Loading of new cars with accessories by car dealers is happily just about a thing of the past. Recently told here is a story about an eager car buyer who purchased a high priced car loaded with accessories: radio, heater, bumper brackets, backup lights, and plastic wheel trims was only the beginning of the list. About 4 months after he bought the car, he had to repair a flat tire. In the process of changing it, one of the plastic wheel trims was torn. Sure enough, there was a chrome plated metal wheel trim rim—purchased at extra cost—under the plastic trim rim on each wheel. It may be explained that this is the only case to come to our attention so far where one accessory was actually piled on top of the *same* accessory.

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THE FEDERAL VIEW

THIS WEEK IN WASHINGTON

Rep. Celler seen using witness stand as showcase for monopoly charges . . . Labor's monopoly powers under study, too . . . Secretary Tobin sees brighter employment.

by Eugene J. Hardy

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Washington — Industry-minded congressmen are keeping a sharp eye on the activities of Representative Celler, D., N.Y., and his efforts to whip up new interest in "the ominous growth of monopoly in America." (THE IRON AGE, Aug. 4, p. 40).

Mr. Celler has decided to hold off introduction of new antitrust legislation until next year. His present plan is to keep the congressional antitrust drive alive for the remainder of this year by the speeches and statements of a group of hand-picked witnesses who are appearing as witnesses before the House Judiciary Committee, of which Celler is chairman.

Using the witness stand of his committee room as a convenient showcase, Celler hopes to drum up greater enthusiasm among his fellow members of Congress for enactment of new antitrust legislation in 1950, which, of course, happens to be an election year.

Vague About Legislation

Thus far, Celler has been purposefully vague about just what form his legislative proposals will take next year. But, despite his lack of specific statements as to what kind of a bill or bills he has in mind, there are some good tips in the remarks of some of the selected witnesses who have been displayed in his committee room.

Here are some pertinent excerpts:

Everett N. Kassalow, CIO: Any attempt to speak of labor as a monopoly is simply introduction of a red herring into the subject.

Walter Adams, Michigan State College: Perfect competition is neither possible nor necessary. We need laws that will protect consumers, prevent price and production controls by large industries, protect new technology from artificial frustration, and maintain both legal and economic freedom of entry for new enterprise.

Donald Richberg and *Morris Ernst, attorneys:* Bigness in business isn't necessarily relative to efficiency. In some fields, size appears to have passed beyond the point of optimum efficiency. If smaller concerns are protected, they can take business away from larger ones.

Thurmond Arnold, attorney: A continuing joint committee of Congress should study the concentration problem and should deal with cases in which the law is found inadequate.

Study Labor Monopolies, Too

On the other side of the Capitol, a Senate committee is trying to make up its mind as to whether or not certain labor unions hold monopoly powers in their respective industries.

Much evidence that the affirmative is true has been presented to the committee, but there are no present indications that a majority of the members of the Senate Banking Committee is inclined to take corrective action.

One of the principal targets of complainants before the committee has been John L. Lewis and his United Mine Workers of America. Such a witness was Harry M. Moses, speaking for the coal operators.

Moses declared that the practice of entering into national wage agreements in the coal industry, coupled with UMW's power to shut off production at any mine or group of mines, gives the union an economic power which "becomes detrimental to the industry and the entire national economy."

"The United Mine Workers of

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America have demonstrated an arbitrary abuse of this economic power that should cause grave concern as to our ability to continue the levels of production which are required by our economy, as well as our ability to maintain the efficiency of our operations," he testified.

Mr. Moses added his view that the UMW has evidenced a "complete contempt of laws," and also has demonstrated its ability to "enforce pressure upon the industry to accept bargaining results which the union now claims removes it from obligation either under the law or under the wage agreement."

Another witness, J. Raymond Tiffany, speaking for the National Small Business Men's Assn., declared that abuses by unions affect small business men more than they do big business.

Mr. Tiffany submitted a 5-point program of legislative action to correct present abuses by labor:

(1) Make labor subject to its share of regulation under the antitrust laws.

(2) Set up an independent commission, free from the Labor Dept., the Commerce Dept., and the National Labor Relations Board, for adjustment of disputes.

(3) Bar featherbedding and set penalties for violations.

(4) End industry-wide bargaining.

(5) Set up standards to govern procedure in order to side-step "delegation run riot" and the risk of unconstitutionality.

Army Orders Lift Trucks

Washington—A contract to supply the Army with $197,100 worth of tank steel was awarded Parkersburg Rig & Reel Co., according to the Defense Dept. Other supply contracts last week included 277 fork lift trucks from the Clark Equipment Co. at $815,130 and 186 fork lift trucks and spare parts from the Hyster Co. for $956,985.

THE BULL OF THE WOODS — By J. R. Williams

THEM SILENT SOCIALS SHOULD BE CALLED HOPELESS HUDDLES! EVERY FEW YEARS JUST WHEN THEY'RE ALL EXPECTIN' TO GO UP A NOTCH, WHY---
YES, THEY BRING IN AN EXPERT FROM A WASH TUB COMPANY AND PUT HIM OVER THEM! IT MUST BE AWFUL TO BE NEARLY UP!
J.R.WILLIAMS 8-26
THE STATIONARY ENGINEERS
T. M. REG. U. S. PAT. OFF. COPR. 1949 BY NEA SERVICE, INC.

Labor Secretary Tobin Sees Brighter Employment Outlook

A brighter outlook for the employment situation, a source of worry to the government for the past few months, was forecast last week by Labor Secretary Tobin. He predicted that industrial jobs would be increased by a million over the last half 1949 and that there would be a corresponding drop in the unemployed.

The optimistic tone was occasioned by a number of developments. For one thing, the Commerce Dept. had reported a drop of $6 billion in the national product rate (now at $256 billion) during the second quarter. Tobin saw in this only a cutback and leveling off of a business inventories which would add to future demands. This, he said, would strengthen the normal fall seasonal pick-up.

Government Reports Cited

Lending support to the forecast were government reports which showed that contract construction, lagging earlier, was now scoring more than seasonal gains in employment—with 2,150,000 workers engaged directly in such work. Still to be felt is the effect of the recently enacted public housing construction.

Another factor in the employment picture, Mr. Tobin points out, is the fall re-opening of schools and colleges. This will not only leave vacancies to be filled but will remove from the jobless lists such students as had been unable to find summer work.

Should the forecast be borne out, it would have the effect of reducing unemployment to a total of something like 3 million, of which half would be normally classified as unemployable with another quarter million in the floating stage (transferring from one job to another, strikes, etc). Thus, the year would end without much change from its beginning.

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ROUNDS

SIZE	LBS. IN STOCK
¼" Rd.	12081
7/16" Rd.	13541
⅜" Rd.	26871
7/16" Rd.	7740
½" Rd.	17709
9/16" Rd.	5770
⅝" Rd.	14209
¾" Rd.	23382
⅞" Rd.	22370
1" Rd.	36265
1⅛" Rd.	11243
1¼" Rd.	52237
1⅜" Rd.	3562
1½" Rd.	27280
1⅝" Rd.	4554
1¾" Rd.	21887
1⅞" Rd.	11698
2" Rd.	24023
2¼" Rd.	8822
2½" Rd.	7841
2¾" Rd.	9904
3" Rd.	17036
3½" Rd.	6272
4" Rd.	2426

SQUARES

SIZE	LBS. IN STOCK
3/16" Sq.	1141
¼" Sq.	10644
5/16" Sq.	10391

SQUARES

SIZE	LBS. IN STOCK
⅜" Sq.	4712
7/16" Sq.	5807
½" Sq.	5086
9/16" Sq.	6018
⅝" Sq.	2452
¾" Sq.	4112
⅞" Sq.	1783
1" Sq.	4914
1¼" Sq.	6543
1½" Sq.	8653
1¾" Sq.	4611
2" Sq.	6479
2½" Sq.	3954

FLATS

SIZE	LBS. IN STOCK
1" x ¼"	3170
1½" x ¼"	3921
2" x ¼"	3679
1" x 5/16"	1812
1½" x 5/16"	984
2" x 5/16"	1234
¾" x ⅜"	4948
1" x ⅜"	2037
1¼" x ⅜"	3983
1½" x ⅜"	2091
2" x ⅜"	3893
2½" x ⅜"	4913
3" x ⅜"	2473
⅝" x ½"	3633

FLATS

SIZE	LBS. IN STOCK
¾" x ½"	1769
⅞" x ½"	4352
1 x ½"	7079
1½" x ½"	3414
2" x ½"	7622
2¼" x ½"	1929
2½" x ½"	3277
3" x ½"	4418
6" x ½"	2056
¾" x ⅝"	2493
1" x ⅝"	2132
1½" x ⅝"	2024
2" x ⅝"	2842
2½" x ⅝"	692
3" x ⅝"	3414
1" x ¾"	4673
1½" x ¾"	991
1¾" x ¾"	2983
2" x ¾"	6724
2½" x ¾"	8429
3" x ¾"	2322
4" x ¾"	1915
2" x ⅞"	2658
1½" x 1"	1998
2" x 1"	2072
3" x 1"	4793
4" x 1"	1356
5" x 1"	1206
2" x 1½"	5255
5" x 2"	1799

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WEST COAST PROGRESS REPORT

Far-western fabricating again stimulated by another rail freight advance . . . New ore at Twenty-Nine Palms prospect.

Digest of Far West Industrial Activity

by J. Reinhardt

San Francisco—Another weary adjustment, always upward, applies on transcontinental and interzone rail freight rates effective Sept. 1, to cause all far western distributors and purchasers of commodities originating east of the Mississippi River to revise their prices, so as to pass the new boost on to consumers. Always and at the same time the umbrella spreads, under which West Coast fabricators and de-centralized manufacturers are encouraged and subsidized.

Since last January an interim 5 pct advance has been in effect and this now becomes 9 pct for transcontinental hauls and 8 pct for shipments within the Western zone. As compared with basic rates in effect June 30, 1946, which were practically prewar rates, the tariff on such a preferred commodity as alloy bars has increased 37 pct in the 3-year period, while the rate on ordinary miscellaneous manufactured goods has increased 64 pct. In the farm machinery trade, advances applying to farm tractors have been 30 pct in the last 18 months and the current advance represents from ½ to 1 pct addition to list price.

Before the war intercoastal water rates provided a lower though more leisurely basis of shipment. These rates have advanced in proportion though as yet the Pacific American Steamship Assn. has not announced an adjustment to parallel the latest rail advance. But only one third the number of intercoastal vessels operate these days as compared with prewar, though total potential traffic has probably increased two or three-fold, now predominantly rail hauled.

Panama Canal Tolls Too High

Latest move of the ship operators is an attempt to have tolls reduced at the Panama Canal. It now costs $7000 to pass a C-3 type freighter through the Canal, or $14,000 a roundtrip, an amount equal to the crew's wages for an entire month. This is at the rate of 90¢ per vessel ton. In March 1948 a rate increase to $1.00 was authorized but the order was suspended pending a congressional investigation.

The ship operators claim they lost $4 million between 1935 and 1939 while they were paying $25 million in Canal tolls. They point out that of $609 million collected at the Canal since 1914, $575 million have come from tolls on commercial ships. Thus the government makes little if any financial allowance or budgetary contribution on behalf of toll-free government ship transits (including the Navy) or U. S. government activities and civil functions at the Canal including hospital, schools, recreation installations and the like. West Coast shippers are primarily affected since 64.2 pct of waterborne cargoes out of Pacific ports clear through the Canal and pay tolls compared with 13.9 pct from Atlantic ports and 20 pct from Gulf ports.

High-Grade Ore Available For Pacific Coast Openhearths

Los Angeles—High-grade iron ore, which the owners claim is similar in quality to Norwegian and Brazilian, will be available for openhearths after Oct. 15 from a deposit near Twenty-Nine Palms and named The Iron Age (No connection with this publication).

The deposit has been leased by Storey-Simpson Co. of Santa Ana, Calif., is on the Joshua Tree National Monument area, and is estimated to contain from 1 to 3 million tons, of which approximately 300,000 tons are above the surface.

The Iron Age mine is said to be fortunate in the uniform high grade of the ore and its extremely

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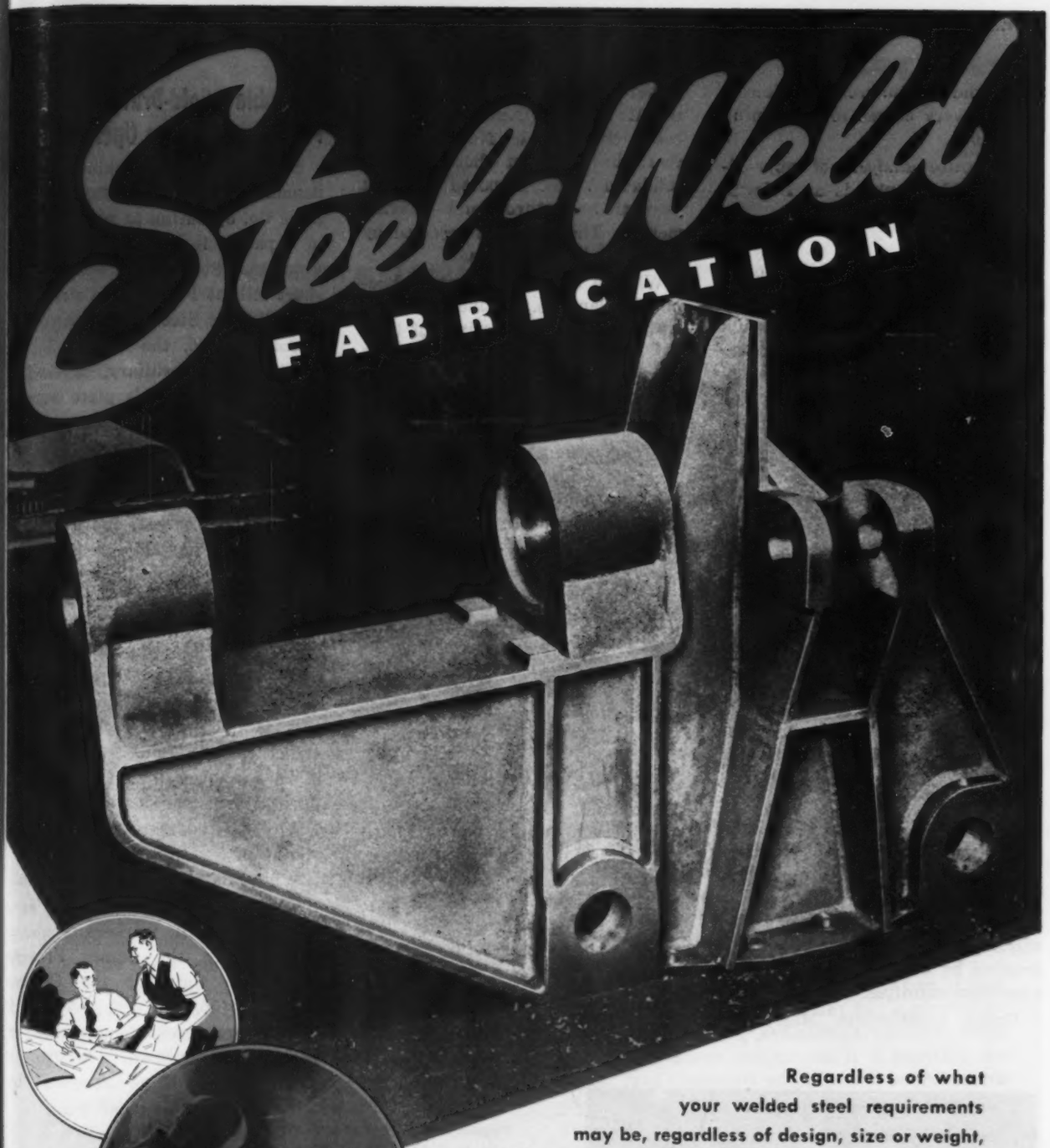
Steel-Weld FABRICATION



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dense and brittle-breaking characteristic, very coarse under mining operations.

Composite analysis of approximately 100 samples is as follows:

Fe	67.37	CaO	0.16
SiO_2	2.98	P	0.06
Al_2O_3	0.65	S	0.07
Mn	0.13	TiO_2	0.32

Current contracts are with cement companies in California and Arizona and steel foundries on the Pacific Coast, but the lessors believe the ore would be valuable for openhearth operation.

Engineering work has been completed on the deposit and the road surveys will be out within the next few weeks. Shipping will be from Amboy on the Santa Fe R.R., 40 miles to the north.

Reveals Proposed Air Mergers

Los Angeles—Indications here are that charges against Consolidated Vultee of political influence in obtaining its large contracts for the B-36 super bomber will be branded as false following hearings in Los Angeles.

As heads of rival aircraft companies testified in behalf of Convair, the inside story of two proposed mergers of major air frame firms was disclosed for the first time. The disclosures came about during a hearing by the House Armed Services subcommittee.

Under questioning, Maj. Gen. Oliver P. Echols, former chief of the Air Material Command and now board chairman of Northrop Aircraft, disclosed that officials of Consolidated-Vultee proposed only last year that Northrop and Convair merge. The plan was rejected by Northrop, however, he said.

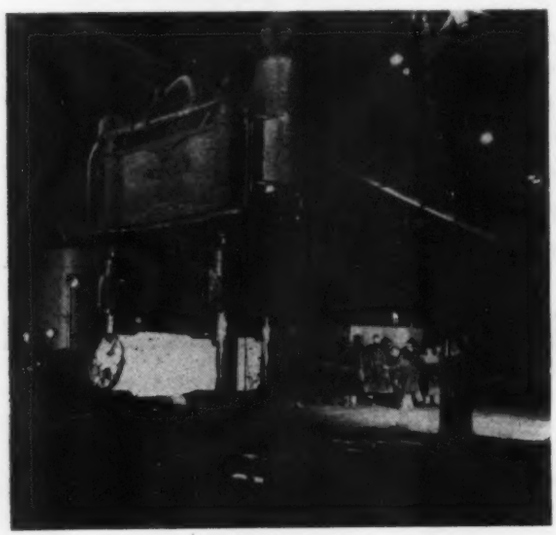
William Allen, president of Boeing Airplane Co., testified that last November, representatives of Curtis Wright discussed merger with his company.

"It seems they wanted to obtain certain top management talent. Nothing came of the idea. I told them we had no surplus of top management, and that I didn't favor merging a company devoted primarily to engines with one building airframes."

Both men were asked if Air Secretary Symington had been suggested as head of the new firms proposed. Each said he himself would have headed the merged corporations.

New Fabri-Valve Officers

Portland, Ore. — New officers have been appointed by the Fabri-Valve Co. of America, Portland, Ore., different from those reported (THE IRON AGE, July 28, 1949, p. 86). L. R. Hussa is president and C. W. Kellogg is secretary. W. C. Rovang at one time vice-president and general manager is not now connected with the firm.



KELLY PRODUCTION: Forging a "Kelly" at the Torrance, Calif., plant of The National Supply Co. Here, the 25 ton ingot receives its first forging under a 1500-ton hydraulic press. A "Kelly" is the metal link that picks up the driving power of an oil rig's engines and transmits it, rotary-wise, to the string of drill pipe that is working down into the earth.

Columbia's Cold-Drawn Sheet Mill Keeps Geneva Operations Up

Salt Lake City—Backbone of the demand which is keeping Geneva Steel Co. operating at about 80 pct of capacity is being furnished by Columbia Steel's new cold-drawn sheet mill at Pittsburg, Calif., and Consolidated Steel of Los Angeles.

Consolidated, the newest U. S. Steel Corp. subsidiary, is taking the bulk of Geneva's plate output and could take more if there weren't other customers to supply. The rolling mill is currently producing hot-rolled coils at the rate of about 215,000 tons per year for the Pittsburg mill. And this is expected to be gradually stepped up to a rate of 350,000 tons, as demand justifies.

As forecast by president Benjamin F. Fairless when the Geneva plant was purchased, the demand for structural shapes in the territory is not sufficient to keep the structural mill going. It has been down for several weeks and it is uncertain just how soon the orders will justify putting it back into operation.

While Geneva's rate of production is less than a few months ago, the number of workers remains substantially the same. Present production force at the Geneva plant is 4450, only 100 less than 2 months ago. Overall employment of the company is 6200. The drop in production is being absorbed by shorter work week per man.

Will Produce Auto Radiators

Los Angeles—Indicating further progress in the West's drive to produce more of the parts for the 600,000 cars to be assembled here during 1949, the Modine Mfg. Co. of Racine, Wis., has purchased a plant in Whittier, near Los Angeles, to supply radiators for Ford, Lincoln and Mercury assembly plants at Long Beach, Los Angeles and Richmond, Calif. and Dallas, Tex. Initial production is planned to average $3 million annually.

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Some Observations On The Accuracy of ISOTHERMAL DIAGRAMS

By B. F. Shepherd
Chief Metallurgist, Ingersoll-Rand Co.,
Phillipsburg, N. J.

DAVENPORT and Bain introduced, in 1930, a method for studying relative reaction rates of austenite in steels of different types. The decomposition of the austenite at various temperature levels was measured metallographically as a function of time and the results were plotted in graphs which became known as S surves on account of their shape.

Preparation of these curves today remains substantially the same as originally described.[1] Small specimens are austenitized and quenched in lead or molten salt at the desired temperature for increasing periods of time. The amount of transformation is fixed by quenching the sample in water and is determined by examining the specimen metallographically. Numerous investigations have measured the progress of the austenite decomposition by dilatometer.

The TTT charts provide such an easy method of exploration of the stability of austenite that they have been widely used for many purposes. The conditions represented by one chart indicate the average behavior of that particular heat of steel under the austenitizing conditions used, and any change in conditions, heat analysis, grain size, austenitizing, etc., will probably be reflected by a change in the austenite behavior.

The charts indicate the transformation of austenite at constant temperature; i.e., isothermally. Transformations in ordinary quenching occur during continuous cooling and it is generally accepted that they start at times and temperatures considerably below and to the right of those indicated by the isothermal curves. Attempts have been made to correlate the isothermal and continuous cooling data, the most impressive of these being the work of C. A. Liedholm.

The picture presented by these charts of austenite behavior is so graphic that they have come into widespread use. Unfortunately the fact

SUMMARY: Extensive cooling rate experiments conducted by the author indicate that specimens undergoing transformation during quenching do so at higher temperatures than those used in isothermal transformation diagrams. Data supporting the author's contentions are presented in the form of cooling curves and cooling rate curves under various conditions.

that the behavior of the steel depicted by the isothermal transformation diagram is for constant temperature conditions is many times lost sight of and it is common to find educators and mathematically-minded metallurgists attempting to apply the diagrams to continuous cooling, i.e., ordinary quenching. The phrase "so many seconds to get by the nose of the S curve" is common, but this trend represents misuse and misunderstanding, and should be discontinued.

The curves do provide the metallurgist with a useful tool enabling him to estimate the relative reaction rates of austenite in steels of different types and thereby to visualize in a general manner the structures and hardnesses which will be obtained by continuous cooling. From a practical standpoint, the major uses are; (1) development of cooling cycles for billets and forgings following hot work, and (2) development of annealing practices; may be used for continuous cooling according to Payson.[2]

In 1940, Greninger and Troiano[3] developed the idea that martensite did not form isothermally as indicated by the S surves, and concluded that "the S curve of austenite decomposition does not give a correct picture of the austenite-martensite transformation." This view has since been generally accepted, and revisions were made in plotting isothermal diagrams as suggested by Cohen, and later, Payson.

Certain conditions must be met in S-curve technique to avoid an erroneous picture of austenite behavior. Greninger and Troiano at that time described several of these basic requirements as follows:

(1) "If steel is hot quenched to any temperature below A_{e1}, 100 pct austenite *can be retained for any bath temperature.*

(2) "*A measurable time interval is required for the beginning* of austenite decomposition at that temperature.

(3) "In other words, austenite decomposition is pictured as taking place *entirely* at constant temperature after the specimen has reached the temperature of the quenching bath."

The italicized words emphasize observations made by the author and reported herewith that S curves of *quick-reacting steels* made by the initial technique (still in common use) give erroneous values over a considerable temperature range on either side of the nose, the errors being of much greater magnitude than is generally assumed.

Attention was called to this probability by Gensamer, Pearsall and Smith[4] as follows:

"Further experimental work leads them to believe that in some instances the whole specimen did *not* react at the temperature of the lead bath . . . leads them to the opinion that all of the isothermal decomposition studies so far reported for plain carbon steels may be in error in this respect."

Gensamer, Pearsall, Pelline and Low[5] gave more detailed data in a study of the tensile properties of pearlite, bainite and spheroidite. They showed cooling curves of a 0.260 in. round, plain carbon eutectoid steel quenched in lead at 1310° to 660°F. These curves did not show the subsequent period during transfer to a drastic brine quench. The curves indicated that ¼ in. specimens react about 90°F above the bath temperature, and ⅛ in. specimens about 36°; these figures are for the mean temperature of the reaction and not the maximum at which the reaction occurs, which is even higher. With 0.075-in. specimens the reaction begins about

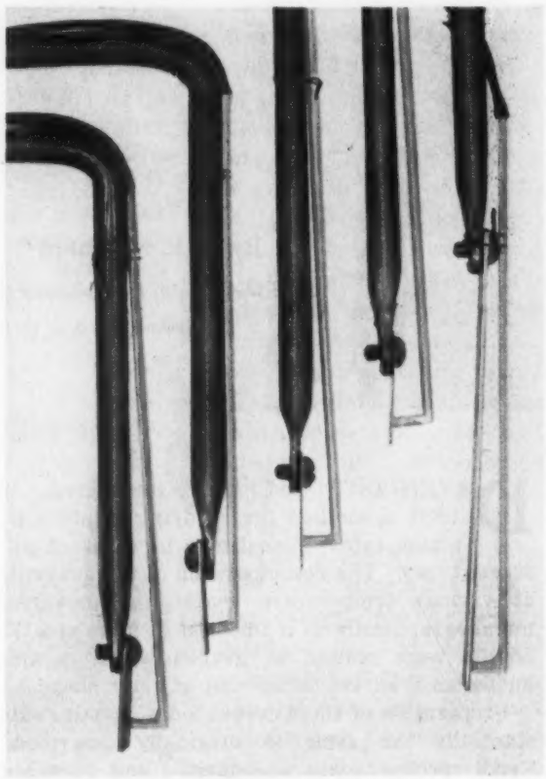

FIG. 1—Test specimens percussion welded to thermocouples for cooling rate experiments.

14° above the bath temperature. No cooling curves are shown on the specimens below 0.260 in. diam.

The above authors state, "The recalescence studies for lead-quenched specimens *big enough for tensile tests* show that when the lead bath temperature is near the temperature of fastest reaction, the reaction product is formed over a range of temperature." Their summary states, "In isothermal reaction studies of low alloy steels using lead baths for quenching and maintaining the reaction temperature, extreme care must be exercised to be sure that the reaction rarely takes place at the bath temperature, even with

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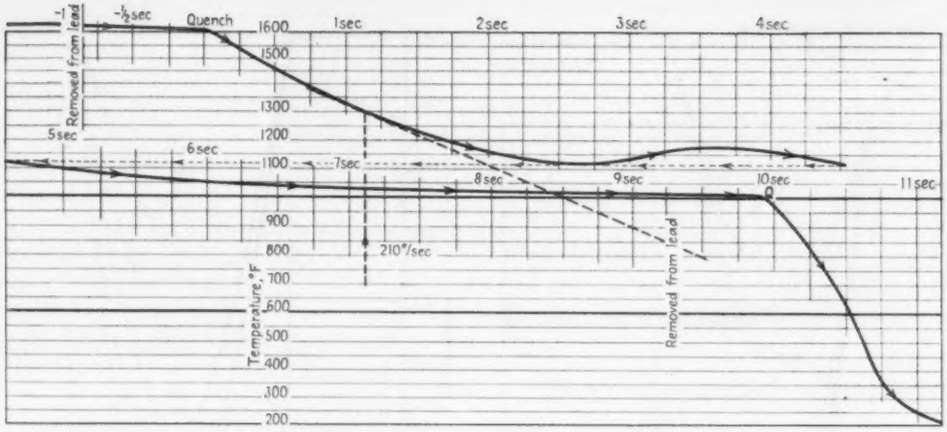

FIG. 2—Typical cooling rate data. Curve represents steel A quenched from 1600°F into lead at 1000°F for about 10 sec. and then quenched in water.

very small specimens; with larger specimens it is necessary to determine the reaction temperature which then occurs over a range of temperatures."

This work offered further indications that the temperature-time values of isothermal curves for fast reacting steels were open to serious question.

Morral[6] gave data for constructing typical S curves for 192 steels of which 53 were fast-reacting steels. Only 38 pct of these steels had a time above 10 sec for completion of reaction at the nose, and 45 pct had times of 5 sec or less. The data were intended for "the practical heat treater." It should have been long since apparent from Gensamer's work that these short time values were probably erroneous.

Grange and Kiefer[7] state, "Isothermal diagrams may be inaccurate, particularly with regard to the beginning line at the nose in fast-reacting steels and to the beginning and ending lines in the region just below the equilibrium transformation temperature, A_{e1}. It is to be noted that for the rapidly transforming steels in the temperature range, in which the time is very short, some uncertainty in the precise time required is of no practical significance."

This comment is strange since the authors earlier state, "These diagrams show *precisely* the effect of temperature level upon the time required for the measurable beginning and ending of transformation and upon the character and hardness of the isothermal product." This positive statement does not indicate any exception as to the beginning time for fast-reacting steels. Such statements create an impression in the infallibility of S-curve data that is to be regretted.

Payson and Klein[8] recognized this factor; "These data given in table I (in the reference) show that even the small specimens used do not instantaneously attain the temperature of the bath into which they are quenched, but that a definite time must be allowed for the specimen to get to the bath temperature."

TABLE I

Analyses of Two Types of Steels Tested for Cooling Characteristics.

Specimen	C	Mn	P	S	Si	Ni	Cr	Mo
A	1.08	0.24	0.012	0.027	0.20	0.11	0.50	...
B	0.42	0.90	0.005	0.014	0.26	1.72	0.78	0.33

Greninger in commenting on the above paper stated, "S curves have continued to appear in the literature but in these publications discussion of martensite formation has been avoided or passed over lightly as though the subject were one of minor importance in both theory and practice of heat treatment."

The same thing appears true regarding the time and temperature values of S curves of quick-reacting steels. The present author has

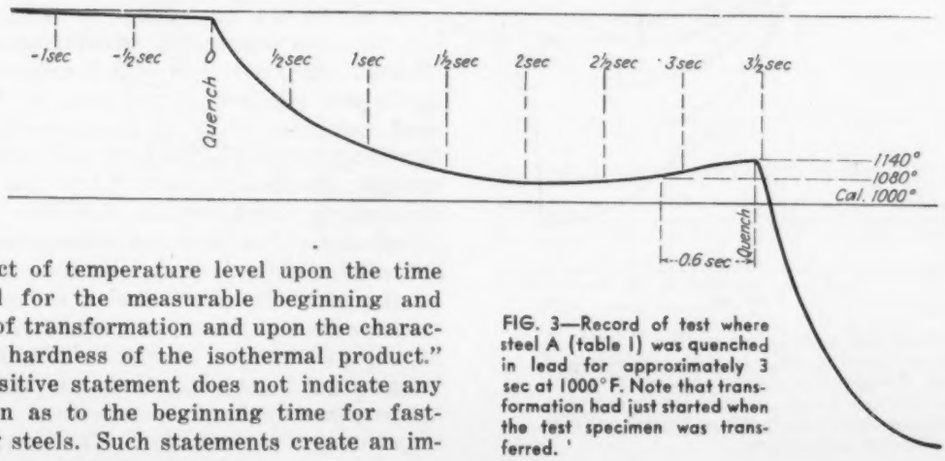

FIG. 3—Record of test where steel A (table I) was quenched in lead for approximately 3 sec at 1000°F. Note that transformation had just started when the test specimen was transferred.

Isothermal Diagrams

Continued

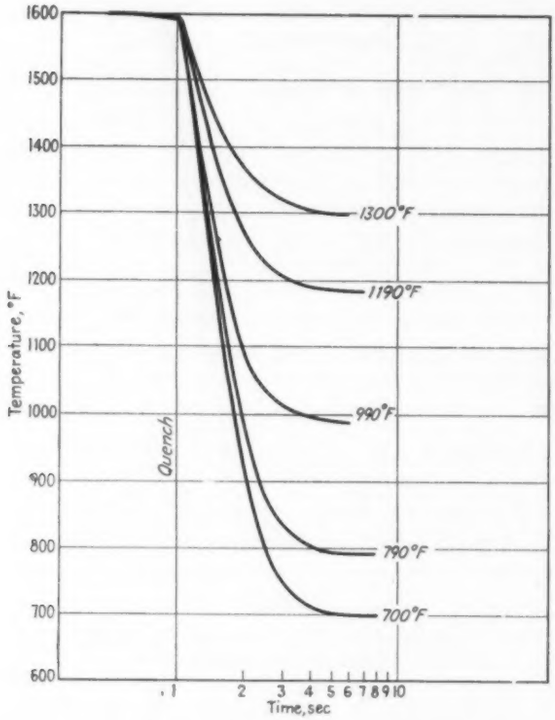

FIG. 4—Midwall cooling time of steel B specimens 1/16 x 1/2 x 3 1/2 in. quenched from lead at 1600°F into agitated lead at temperatures noted.

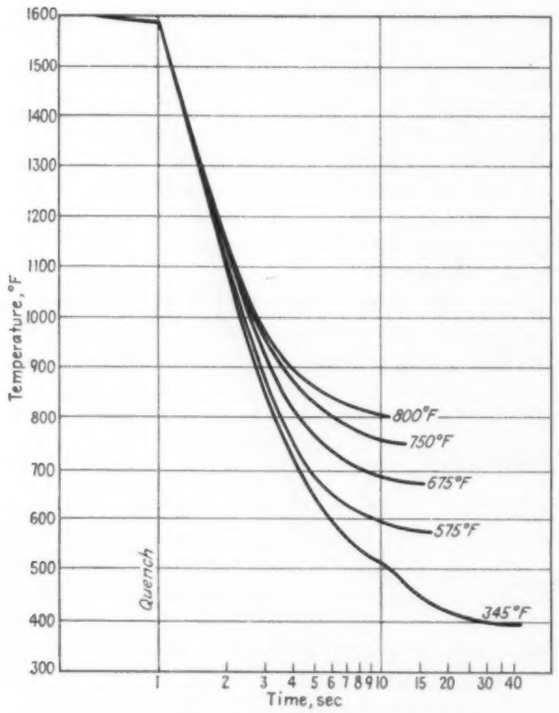

FIG. 5—Midwall cooling time of steel B (table I) specimens 1/16 x 1/2 x 3 1/2 in. quenched from lead at 1600°F into agitated salt (Aeroheat No. 300) at temperatures noted. Transformation occurring in specimens quenched in salt at 400°F has materially retarded cooling time.

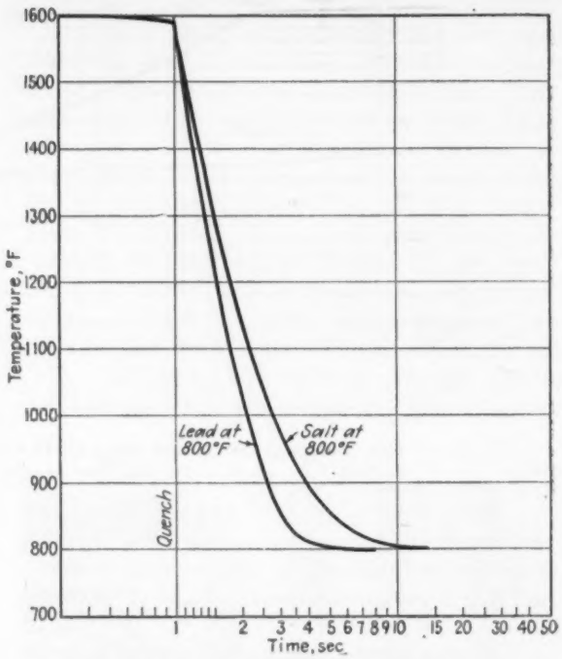

FIG. 6—Showing comparison of agitated lead and salt at 800°F taken from figs. 4 and 5. Average cooling rate at 1300°F is 575°F per sec for lead and 397°F per sec for salt.

always been intrigued with S curves from the viewpoint of the practical problems involved in the preparation of such data. Investigators usually speak of the quenching speed of the molten lead or salt bath as of high intensity. These baths are operated over a wide temperature range so it is logical to assume a wide variation in quenching rate on a specimen of constant mass.

Specimens have generally been 1/16 in. thick. While this represents thin sheet, it is still an appreciable mass compared to a much thinner sheet. Quenching speed generally is greatly affected by mass.

Cooling and heating curves are asymptotic. It would seem, therefore, that assumptions that S-curve specimens had attained the bath temperature in such a short-time interval as 3 sec were optimistic, especially when the quenching bath was at a high temperature, and, therefore, of relatively low quenching intensity.

A specimen undergoing transformation gives off heat. An interesting point is presented as to the balance attained between mass of the specimen, heat given off by the transformation, heat extracting capacity of the bath, and temperature stability of the specimen. While the steel is undergoing transformation, how does the heat of transformation affect the temperature of the specimen when this heat is not carried away by the quenching bath during the period of transfer in air? How can percent breakdown of the austenite be plotted as a strict time-temperature function if there is an appreciable temperature rise?

In this type of work and similar investigations

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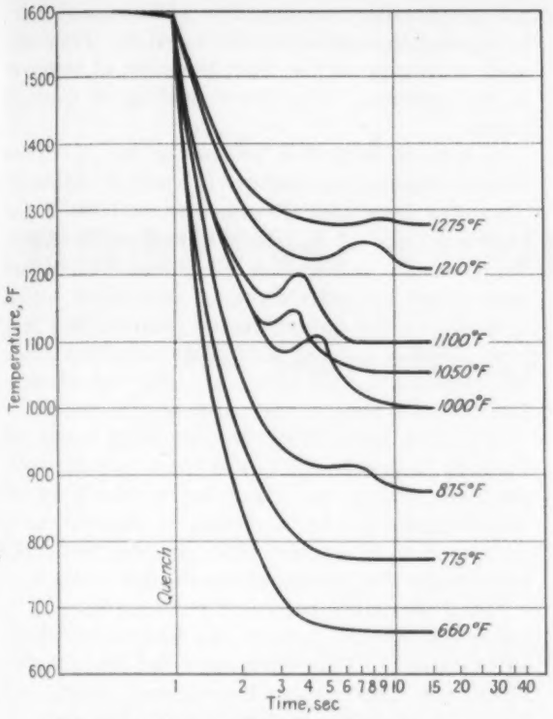

FIG. 7—Midwall cooling time of steel A specimens 1/16 x ½ x 1¼ in. quenched from lead at 1600°F into still lead at temperatures noted.

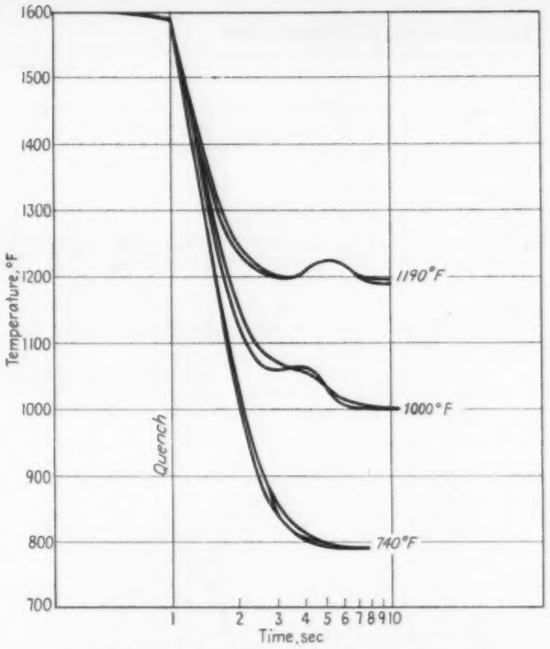

FIG. 8—Midwall cooling time of steel A specimens 1/16 x ½ x 3½ in. quenched from lead at 1600°F into agitated lead at temperatures noted. Individual tests are shown to illustrate substantial agreement of tests.

of martensite transformation, transfer time is often reported as *fraction of a second* or some similar term. How fast can a piece be manually transferred under the most favorable conditions? Can an operation of this character be completed in a fraction of a second?

To answer these questions, cooling curves were obtained on quick-reacting steels with specimens and procedures similar to those used to obtain S-curve data. Specimens ½ in. wide, 1¼ in. and 3½ in. long were ground to the conventional 1/16 in. thickness, and to lesser thicknesses, two steels, analyses of which are given in table I. The specimens were attached to ⅜ in. rod and the thermocouples percussion welded midwall ¼ in. from the end as shown in fig. 1. Specimens were immersed in lead at 1600°F to a depth just covering the attaching screw, removed and quenched in clean skimmed lead or salt, in baths immediately alongside the heating bath; held for desired time estimated by means of a metronome, removed and quenched in water. For different tests the quenching baths were either quiescent or agitated with an air-driven propeller.

The cooling rate apparatus[9] used in the development of the PV test was arranged so that

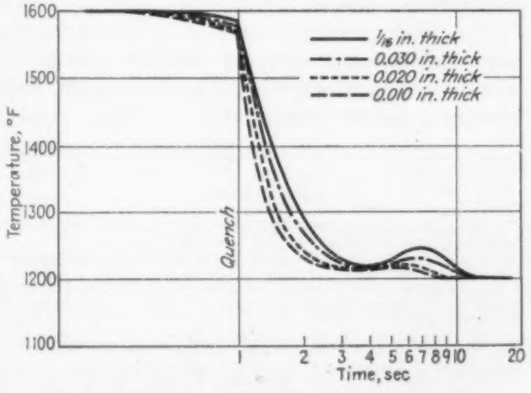

FIG. 9—Midwall cooling time of steel A specimens 1/16, 0.030, 0.020 and 0.010 in. thick by ½ x 1¼ in. quenched from lead at 1600°F into still lead at 1200°F. Decreasing mass increases cooling rate and reduces the amount of heat of transformation, thereby reducing the temperature rise.

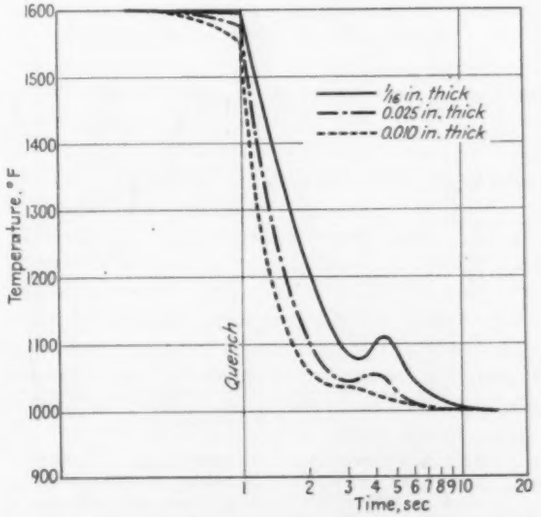

FIG. 10—Midwall cooling time of steel A specimen 1/16, 0.025 and 0.010 in. thick, by ½ x 1¼ in., quenched from lead at 1600°F into still lead at 1000°F. Effect is similar to that shown in fig. 9.

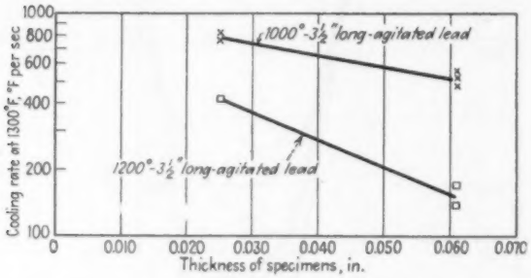

FIG. 11—Effect of thickness upon cooling rate at 1300°F of specimens 1¼ in. and 3½ in. long.

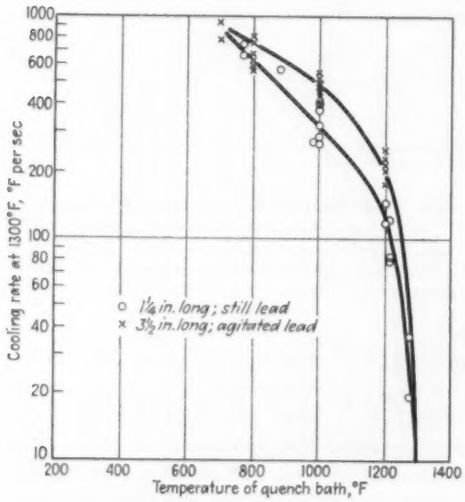

FIG. 12—Effect of 1¼ in. v. 3½ in. long specimens, 1/16 in. thick x ½ in. wide (distance specimen moves during immersion affects cooling rate) and agitation of lead upon cooling rate at 1300°F. Effect of agitation is neutralized as quenching intensity is reduced by higher bath temperature.

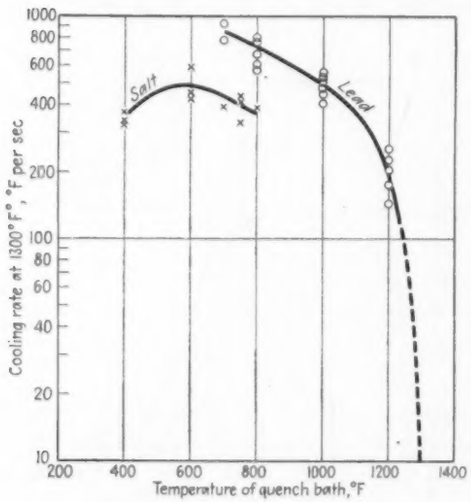

FIG. 13—Comparison of cooling rate at 1300°F upon 1/16 x ½ x 3½ in. specimens quenched from lead at 1600°F into agitated lead and salt. As viscosity of salt is decreased by increase in temperature, rate increases until it is neutralized by decreasing temperature differential of bath and specimen similar to behavior of oil at lower temperatures.

the temperature trace could be *kicked* about 1 in. by a portable pushbutton Microswitch. This was used to indicate on the chart the start of removal of the specimen from either heating or cooling baths.

A typical record is shown in fig. 2. This shows temperature changes in steel A (table I) quenched from 1600°F into lead at 1000°F for approximately 10 sec, then quenched in water. Temperature calibration lines are placed on each chart by superimposing controlled millivoltages on the galvanometer prior to the test run. Cooling rate at 1300°F is obtained from the tangent to the curve at 1300° as shown. The transfer time is approximately ¾ sec.

It will be noted that the quenching power of the bath is insufficient to prevent a marked temperature rise in the steel due to the heat of transformation. As a result, a considerable period of time elapses until the specimen approximates the temperature of the bath.

Fig. 3 shows the record of a test on steel A in which the quench period was approximately 3 sec at 1000°F. Transformation had just started when the piece was transferred from the 1000°F bath to the water quench. The heat of transformation caused a rise in temperature of 60°F during the transfer which took 0.6 sec.

Data were plotted on semilog paper for ease of interpretation. Curves generally represent average of more than two tests which were in substantial agreement. Figs. 4 through 13 are self-explanatory, and indicate clearly that the time-temperature values shown in S or TTT curves of *quick-reacting steels* are plotted from assumptions of equilibrium conditions which are not attained on the short period quenches. Specimens undergoing transformation during quenching do so at higher temperatures than those used in the isothermal transformation diagrams.

The changeover from lead to salt at lower temperatures in the construction of these curves cannot be done without recognition of the difference in cooling power of the baths. The cooling rate of lead is markedly lowered as the temperature differential between specimen and bath decreases.

The lines usually drawn on TTT curves for beginning and ending of transformation for quick-reacting steels should be eliminated wherever uncertainty exists.

References

[1] "Transformation of Austenite at Constant Sub-Critical Temperatures," Trans. AIME, vol. 90, 1930, p. 117.
[2] Peter Payson, "The Annealing of Steel," THE IRON AGE, 1943, June 24; July 1; July 8; July 15; July 22; Sept. 9.
[3] Greninger and Troiano, "Kinetics of the Austenite to Martensite Transformation in Steel," Trans. ASM, vol. 28, 1940, p. 537.
[4] M. Gensamer, E. B. Pearsall and G. V. Smith, "The Mechanical Properties of the Isothermal Decomposition Products of Austenite," Trans. ASM, 1940, vol. 28.
[5] M. Gensamer, E. B. Pearsall, W. S. Pelline and J. R. Low, Jr., "The Tensile Properties of Pearlite, Bainite and Spheroidite," ASM, vol. 30, 1942, p. 983.
[6] F. R. Morral, Metal Progress, October 1945, p. 818.
[7] Grange and Kiefer, ASM 1941, vol. 29.
[8] Payson and Klein, ASM 1943, vol. 31, p. 221.
[9] Hardenability of Shallow Hardening Steels Determined by the PV Test," Trans. ASM, 1946, p. 383. See also "The PV Test," THE IRON AGE, Nov. 14, 1946.

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Effect of

BRAZING TEMPERATURES

On Base Metal Properties

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East Pittsburgh

SUMMARY: Effects of the heating and cooling cycles encountered in furnace brazing operations on as-cast and wrought nonferrous metals and wrought carbon and alloy ferrous metals are slighter than might be anticipated. Studies of this problem are described and results evaluated for an extensive series of both ferrous and nonferrous compositions.

AMONG modern metal joining methods, furnace brazing has gained recognition because of its advantages of high production rates at low unit cost, cleanliness of as-brazed articles, minimum residual stresses, and the high strength of brazed joints.

Furnace brazing requires the use of a gas-tight furnace, suitably heated by gas or electricity, within which is maintained a positive pressure of controlled reducing atmosphere. The controlled atmosphere is usually supplied by a generator of the partially combusted gas type.

Since this method involves heating the entire assembly to temperatures that may change its metallurgical properties, the design engineer is confronted with a need for data on the mechanical properties of metals that have undergone the heat-treatment that is the unavoidable by-product of the brazing process.

These required data are in addition to the information required concerning brazed joint strength and how it can be affected by such things as the brazing materials used, the joint spacing, the mass and shape of the parts involved, and the strength of the metals comprising the components of the assembly.

Unless these variables are at a minimum, because of simplicity of the assembly, it may be quite difficult to evaluate the joint strength of a new design accurately. Samples may be required to establish the final design requirements to develop a satisfactory joint.

Much information has been published in recent years attempting to correlate shear, tensile and impact strengths with brazing material, base material, joint and component design, temperature and time. Where furnace brazed joints are considered, the information is almost exclusively concerned with copper brazed assemblies. On the other hand the data on silver brazing alloy joints are based largely on assemblies made up by methods other than furnace heating. Nevertheless the strength values given are widely used in designing parts for furnace brazing. Little information of any scope has appeared on the effect of passage through the furnace brazing

TABLE I

Composition of Metals and Alloys Tested

Nonferrous Compositions

No.	Material	Nominal Composition, Pct								
		Cu	Zn	Sn	Pb	Si	Fe	Al	Ni	Mn
1	Copper	99.9								
2	Bronze	85 to 89	4 to 7	7 to 9	1 max.					
3	Manganese Brass	57 to 61	36 to 40				1 to 1.5			0.2 to 0.5
4	Red Brass	84 min.	6 to 12	2 to 4	1 to 4					
5	Silicon Bronze	Bal.	3 to 6			1.4 to 1.8	0.55 to 0.75			
6	Silicon Bronze	Bal.				4 to 5	1.4 to 2.3			
7	Bronze	Bal.		3.5 to 5	14 to 17					
8	Bronze	84 to 85.5	4.5 to 6.00	4.25 to 6.00	4.25 to 5.75					
9	Aluminum Bronze	85 to 89		0.5 max.			2.5 to 4.0	7 to 9		
10	Brass	60 to 63	Bal.		2.5 to 2.75					
11	Monel	Bal.					2.5 max.		63 to 70	2.00 max.
12	Tough Pitch Copper	99.9								
13	Silicon Bronze	Bal.				2.75 to 3.35				0.75 to 1.35
14	Manganese Bronze	Bal.	39	0.7			0.8			0.5
15	Phosphor Bronze	92		8						

Ferrous Compositions

No.	Material	Nominal Composition, Pct							
		C	Fe	Mn	Cr	Mo	Ni	V	S
16	Plain Carbon Steel (SAE 1010)	0.12	Bal.	0.58					
17	Plain Carbon Steel (SAE 1045)	0.43	Bal.	0.58					
18	Plain Carbon Steel (SAE 1095)	1.02	Bal.	0.25					
19	Cr-Mo Steel (SAE 4140)	0.40	Bal.	0.76	0.96	0.25			
20	Ni-Cr Steel (SAE 3135)	0.38	Bal.	0.47	0.56		1.29		
21	Cr-V Steel (SAE 6150)	0.47	Bal.	0.50	0.97			0.15	
22	Hardenable Stainless Steel (Type 416)	0.10	Bal.		12.7	0.50			0.30
23	Austenitic Stainless Steel (Type 303)	0.09	Bal.		18.7		8.5		

Note—Tool steels such as of the air-hardening variety, if simultaneously braze-hardened or copper brazed and hardened, will develop physical properties similar to those to be expected in ordinary heat treatment of these steels.

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cycle on the base metals of brazed assemblies.

Data on mechanical properties of commonly employed metals as affected by brazing, which will aid in selecting materials to be used in furnace brazed assemblies, are presented in this article. If properly applied, it should add assurance to the design engineers' conceptions, although the more complex designs will require data collected from actual sample parts for final evaluation. Such an example is the blower fan assembly in fig. 1. Here the material, size and shape result in an assembly where joint strength is close to the strength of the base materials and testing of the actual part is required.

Conditions of furnace heating encountered in brazing were simulated on specimens machined to standard tensile bar specifications. The metals and alloys employed as test materials and their compositions are listed in table I. Mechanical properties were evaluated in the as-received condition, as well as after the material was subjected to the brazing cycle. This cycle consisted of treatment in an atmosphere of rich (6:1) Exogas* in a pusher-type brazing furnace. For the silver or phos-copper brazing specimens, a temperature of 1400°F was maintained in the furnace, the tensile bars being held in the fur-

**Trademark registered: An atmosphere produced by exothermic combustion of air and natural or artificial gas in ratios between 6:1 and 10:1.*

TABLE II

Effects of Brazing Temperatures on Nonferrous Compositions in As-Cast and Wrought Conditions

No.	Material	Form and Condition	Tensile Strength, Psi	Yield Strength, Psi	Elongation, Pct	Hardness, Bhn
As-Cast						
1	Copper	Cast:				
		As-Received; Specified	25,000	.....	.....	...
		Actual	26,000	8,600	25.4	...
		As-Brazed at 1400° F	26,200	7,900	39.7	...
2	Bronze	Cast:				
		As-Received; Specified	35,000	15,000	18.0	50
		Actual	41,900	22,000	20.3	55
		As-Brazed at 1400° F	47,400	20,000	38.3	55
3	Manganese Brass	Cast:				
		As-Received; Specified	60,000	22,000	25.0	85
		Actual	68,750	27,600	25.0	115
		As-Brazed at 1400° F	72,750	28,500	37.0	107
4	Red Brass	Cast:				
		As-Received; Specified	27,000	12,000	20.0	50
		Actual	31,600	14,000	23.2	48
		As-Brazed at 1400° F	30,300	14,000	18.6	47
5	Silicon Bronze	Cast:				
		As-Received; Specified	40,000	15,000	40.0	60
		Actual	46,400	15,000	63.0	67
		As-Brazed at 1400° F	46,800	15,500	56.5	67
6	Silicon Bronze	Cast:				
		As-Received; Specified	45,000	20,000	13.0	90
		Actual	59,200	20,000	24.3	100
		As-Brazed at 1400° F	56,000	24,000	21.9	97
7	Bronze	Cast:				
		As-Received; Specified	24,000	15,000	6.0	...
		Actual	31,500	25,000	7.1	72
		As-Brazed at 1400° F	32,800	16,000	6.4	72
8	Bronze	Cast:				
		As-Received; Specified	30,000	14,000	20.0	...
		Actual	35,800	19,000	23.1	59
		As-Brazed at 1400° F	36,500	17,000	23.4	50
9	Aluminum Bronze	Cast:				
		As-Received; Specified	65,000	.....	20.0	...
		Actual	79,500	27,500	46.8	100
		As-Brazed at 1400° F	74,500	25,000	44.3	100
Wrought						
10	Brass	Half Hard Bar:				
		As-Received; Specified	57,000	25,000	7.0	...
		Actual	58,000	49,000	20.8	117
		As-Brazed at 1400° F	50,250	17,500	39.6	73
11	Monel	Cold Rolled Bar:				
		As-Received; Specified	90,000	60,000	20.0	...
		Actual	110,000	102,500	20.5	225
		As-Brazed at 1400° F	81,500	33,000	47.5	133
12	Tough Pitch Copper	Hard Bar:				
		As-Received; Specified	40,000	.....	15.0	...
		Actual	43,500	43,000	17.7	78
		As-Brazed at 1400° F	29,700	5,130	42.2	50
13	Silicon Bronze	Hard Bar:				
		As Received; Specified	90,000	52,000	15.0	...
		Actual	93,500	81,000	16.3	188
		As-Brazed at 1400° F	55,800	12,300	75.1	69
14	Manganese Bronze	Hard Bar:				
		As-Received; Actual	79,000	66,500	24.6	163
		As-Brazed at 1400° F	70,000	34,000	43.7	110
15	Phosphor Bronze	Bar:				
		As-Received; Actual	85,000	65,000	.....	...
		As-Brazed at 1400° F	55,000	25,000	.....	...

nace 15 min. Conditions for the copper brazing specimens were unaltered, except that the temperature was at 2012° to 2057°F during the treatment.

Following this procedure, which duplicated the heat treatment undergone during furnace brazing, the tensile bars were tested and the results are tabulated in table II for nonferrous cast and wrought materials and table III for the ferrous compositions.

It will be noted after a study of table I that the mechanical properties of the cast alloy Nos. 1 to 8 are little affected by the furnace brazing treatment. This is to be expected since no major change in the as-cast structure occurs during the reheating for brazing. This being the case, it would seem permissible to advise furnace brazing as a preferred method of joining these materials, all other factors being equal.

The excellent mechanical properties retained by manganese bronze as compared with the remainder of the wrought nonferrous alloys is also of interest. This material in the as-brazed condition compares well in physical properties with Monel (No. 11) and is superior to silicon bronze (No. 13). The yield strength of all these ma-

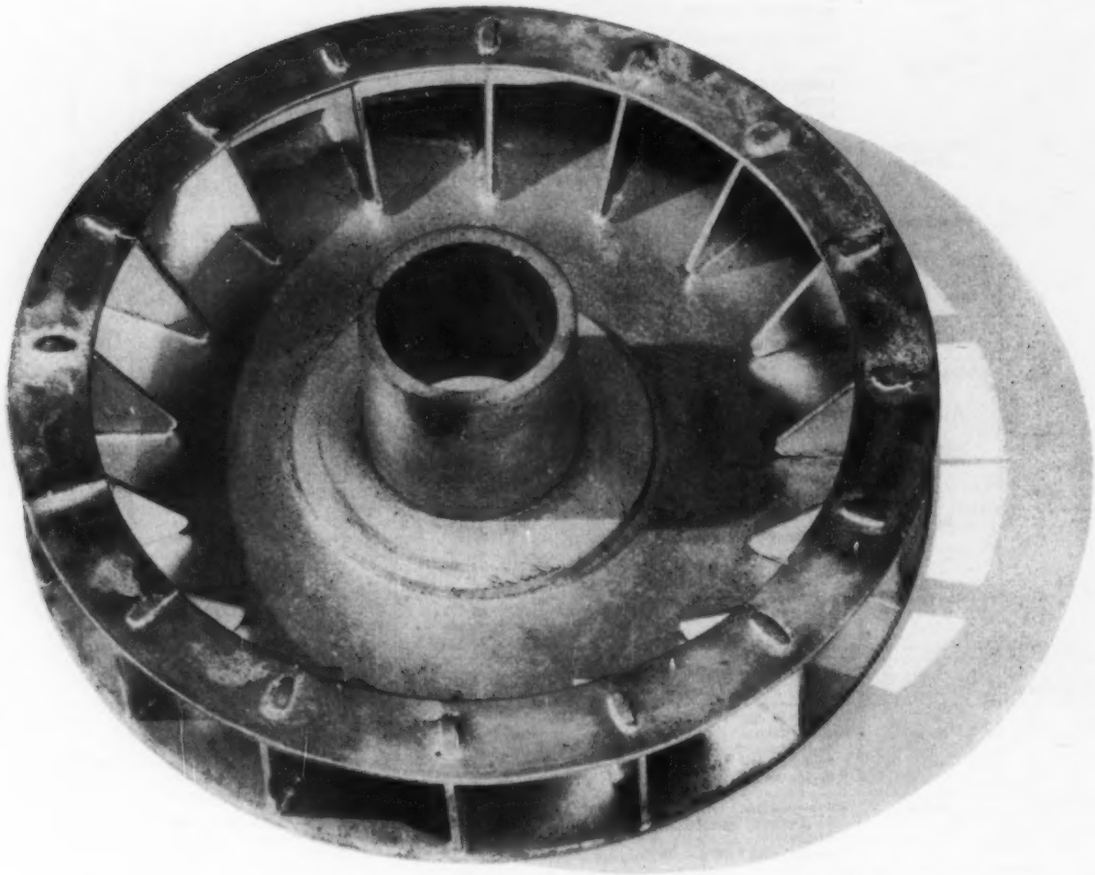

FIG. 1—In this blower fan assembly, the sheet steel was crimped together, the tube and washer press-fitted, and the assembly copper brazed. In such assemblies, joint strength is close to the strength of the base metals, and test data on the part is a requirement.

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terials is reduced considerably by brazing, but again the manganese bronze shows the least reduction.

As to the ferrous compositions listed in table III the mechanical properties of these materials in most cases show no serious drop because of the brazing temperatures. In those cases where a reduction in ductility is indicated by a lower value for elongation, further treatment by normalizing restores the original properties of the material. In the case of materials that are to be heat treated, the properties resulting from simultaneous braze-hardening or copper brazing and hardening would be those to be expected from heat treatment without brazing.

It would appear from the data collected that furnace brazing, especially as applied to the ferrous metals, is seldom detrimental to the mechanical properties of the material. It is only where the strength of the material is the result of cold working, as with No. 16, cold finished SAE 1010, and No. 23, annealed 303 stainless and many of the nonferrous metals, that the annealing effect results in definite lowering of the physical properties.

In general, the studies revealed that mechanical properties, tensile and yield strength, elongation, and hardness, in as-cast nonferrous materials are not appreciably affected by the normal heating and cooling cycles of furnace brazing operations.

In wrought materials, both ferrous and nonferrous, brazing reduces materially the component of strength derived from cold reduction

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New Developments in

Metal Finishing

Reported at AES Meeting

Summary: Discussions covering chrome plating baths, abrasion hardness of chrome plate, acid dips for low carbon steels and for copper base alloys, presented herein are abstracts of papers read at the annual convention of the American Electroplater's Society held recently at Milwaukee. Other papers, covering plating aluminum and magnesium alloys, PR cyanide copper plating, amorphous phosphate coatings for aluminum and plating on high carbon steel, were abstracted in THE IRON AGE, Aug. 11, p. 91.

The wide variation in results obtained in chromium plating, particularly over nickel, were interpreted by R. O. Hull and J. B. Winters, president and research chemist, respectively, R. O. Hull & Co., Inc., Cleveland, in a paper entitled "Some Factors That Influence Operating Characteristics of Chromium Plating Bath." Among these factors are: (1) The kind of nickel (gray or bright), (2) addition agents in bright nickel, (3) activation of nickel before chromium, (4) passivity of nickel developed after plating (either by improper transfer cycles or in the chromium bath itself, which is influenced by bath composition, as sulfate ratio and strength), (5) temperature of operation, and (6) time of immersion in chromium before applying current.

The paper was devoted solely to the study of chromium plating over buffed Watts gray and bright nickel, and to the factors relating to passivity, with means for overcoming it. The term "passivity" is used with some reservation for want of a better descriptive term and refers to any film on nickel which results in either a burned or non-metallic deposit (such as rainbows) from the chromium bath. It was pointed out that such films may be the result of excessive brightener in the bright nickel bath, buffing of the nickel, immersion in water, or immersion in the chromium bath before application of current.

For best results in securing the widest plating range of chromium over nickel, with the simplest procedure, the following conditions should be observed: (1) Bright nickel should be used, with attention given to all addition agent control to avoid excess, (2) the 33 oz per gal chromic acid bath at 110°F should be used, (3) cold water

rinse totaling not more than 2 min may be used. Contact time in the chromium bath must not exceed 15 sec before current is applied.

If the strong chromic acid bath (54 oz per gal) must be used—usually because of lack of sufficient voltage—best results are obtained by adhering to the following conditions: (1) Decrease the chromic acid concentration to the minimum required for the available voltage, e.g., 40 to 45 oz per gal chromic acid, (2) maintain the chromium bath temperature as low as possible, preferably not over 110°F, (3) if bright nickel is the base metal for chromium, control brighteners closely to avoid excess, and (4) transfer rapidly from bright nickel through a quick cold water rinse, 20 to 40 sec in 5 pct (wt) sulfuric acid, rinse and chromium plate with immediate electrical contact.

For plating buffed gray nickel or bright nickel, not chromium plated immediately with either the strong or normal chromium bath, the following cycle should be used: (1) Clean cathodically to remove buffing compound and activate in suitable alkaline cleaner, (2) immerse for 5 min in water, (3) dip quickly in 5 pct (wt) sulfuric acid if the 33 oz per gal chromic acid bath is used, (4) quickly rinse and plate in chromium, and (5) if the 54 oz per gal chromic acid bath is used, clean as above but use the Tucker and Flint 5.8 *N* (300 g per liter) sulfuric acid dip, followed by thorough rinsing to avoid sulfate buildup in the chromium bath. It should be realized that there is no critical concentration of chronic acid and the minimum should be used to secure sufficient current at the available voltage.

In the above procedures, the initial sulfate ratio is optimum at 100:1. However, changes in total catalyst occur with operation, and the plating test method for control of total effective catalyst by adjustment of sulfate is recommended, using sulfuric acid or barium carbonate as may be indicated for sulfate adjustment.

It was pointed out that the present study was conducted to explain some of the anomalies observed in chromium plating over nickel and to offer remedial procedures to overcome troubles when they are encountered in the plant.

Abrasion Hardness Of Chrome Plate

The scratch hardness of chromium electrodeposited under a wide range of conditions was determined by means of the Bierbaum Microcharacter in tests described by J. M. Hosdowich, chief chemist, United Chromium, Inc., New York, in a paper entitled "The Scratch Hardness and Abrasion Hardness of Electrodeposited Chromium." The abrasion hardness of the electrodeposited chromium was determined by means of an automatic machine in which a grinding wheel was intermittently brought in contact with the test piece. A conclusion of practical value to the chromium plater was that both the scratch hardness and the abrasion hardness of any chromium deposit can be accurately estimated from its appearance, regardless of the temperature and current density under which it was deposited. Matte deposits were softest by both methods; bright deposits hard by both methods; frosty and burnt deposits were still harder by the scratch method but softer by the abrasion method.

The main purpose of this investigation was to study the effect of current density and solution temperatures on the hardness of electrodeposited chromium. Given in detail were the plating procedure, covering the test pieces, the electrode holder, the preparation of cathode surface, the cleaning and plating procedure and the composition of solutions.

In scratch hardness tests, decorative chromium plate 0.00002 in. thick can be scratched with a knife, but bright chromium plated under the same conditions to a thickness of 0.002 in. cannot be scratched by the knife. The thinner plate is no softer, but it is indented into the softer base metal.

The results of scratch hardness tests show that there is no apparent difference in the scratch hardness of chromium deposited from solutions having ratios of CrO_3:SO_4 equal to 75:1, 100:1, or 150:1. The presence of 5, 10, or 25 g per liter trivalent chromium has no effect on the scratch hardness of the chromium electrodeposited. The contamination of a chromium plating solution with iron does not affect the scratch hardness of the chromium deposited from it. The scratch hardness of electrodeposited chromium is not affected by heating for 20 hr at temperatures below 392°F. Softening begins at about 437°F and continues as the temperature is raised. Soft deposits have a lower specific gravity than the hard deposits.

It appears that the scratch hardness of electrodeposited chromium on copper is independent of the base metal provided the thickness of the chromium is above the 0.00015 in. min for the scratch test.

The maximum abrasion hardness of about 315 is obtained at 113°, 131° and 149°F in the slightly milky, bright, and slightly frosty plating range. The current density range for maximum abrasion hardness becomes greater as the tem-

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perature increases. The matte deposits have a low abrasion hardness, the milky deposits a medium abrasion hardness, and the bright and slightly frosty deposits a high abrasion hardness, just as was the case with scratch hardness. But as the deposits become frosty and burnt, the abrasion hardness decreases, whereas the scratch hardness continued to increase.

At low current densities giving milky deposits, the abrasion hardness and scratch hardness are both comparatively low. As the current density is increased, both types of hardness increase very rapidly. Then, through the current density range producing slightly milky, bright, and slighty frosty deposits, the two types of hardness are fairly constant. As the current density is further increased, producing rough deposits, a marked difference in the trend of the two curves is seen. The scratch hardness increases while the abrasion hardness decreases.

A conclusion of practical value to the chromium plater is that both the scratch hardness and the abrasion hardness of any chromium deposit can be accurately estimated from its appearance regardless of the temperature and current density under which it was deposited.

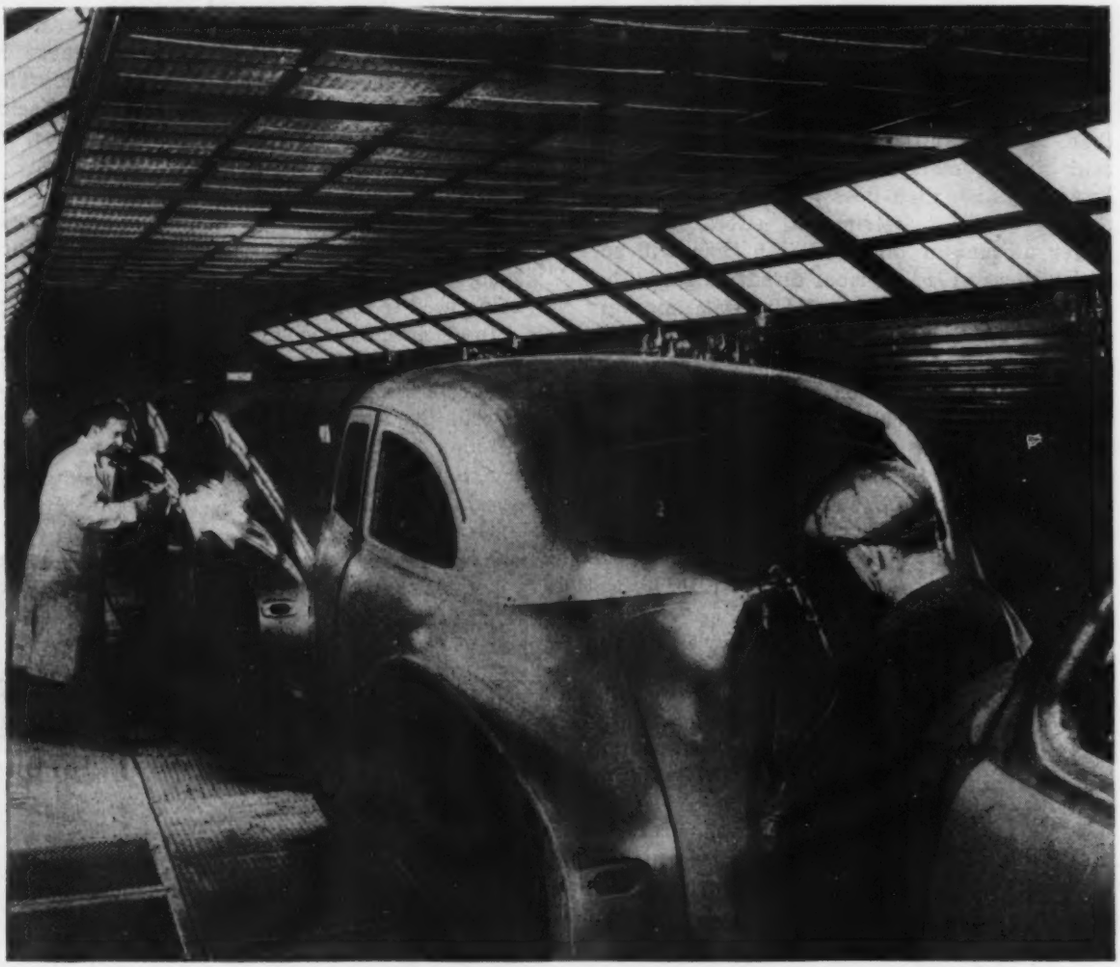
Surveys Acid Dip Practice

A survey of present practice in acid dips for zinc die castings, conducted by Dwight M. Overcash, general superintendent, Brown-Lipe-Chapman Div., G.M. Corp., Elyria, O., showed that 11 large companies finishing die castings used acids and concentration ranges as follows: sulfuric acid from 0.2 to 3.0 pct for 9 companies, 7 of these 9 had the acid between 0.5 to 1.0 pct; phosphoric acid at 3 pct, only 1 firm; citric acid from 0.5 to 1 oz per gal at 1 firm; all acids were used at room temperatures.

The time for which the parts were immersed varied on automatics from 10 to 60 sec; in hand dipping, from 3 to 5 sec. Transfer time for automatics varied from 15 to 30 sec.

The highest scratch hardness was obtained on burnt deposits.

The highest abrasion hardness was obtained on bright and slightly frosty deposits. It seems



Paint spray finishing of automobile bodies in well ventilated booths.

that, for most applications of chromium plate, a high abrasion hardness is more important than a high scratch hardness.

All things considered, it appears that a bright or slightly frosty deposit is best for general use.

According to these results, there is no need for a plater or engineer to run hardness tests on chromium plated parts in production. Many such tests are influenced more by the hardness of the base metal than by the hardness of the chromium plate. As long as the chromium deposit comes out of the plating solution bright or slightly frosty in appearance, it has a hardness equivalent to about 1000 Brinell. If a bright chromium plate appears to be "soft," it is because the base metal is too soft and the chromium deposit too thin. The time and money that would be wasted in testing the hardness of the chromium could be put to better use in testing the hardness of the base metal and the thickness of the chromium deposit.

Acid Dips for Low Carbon Steel

The acid dips used in cleaning cycles for low carbon steels prior to electroplating were discussed in a paper delivered by Ivan C. Hepfer, president, Furniture City Plating Co., Grand Rapids.

Most acid dips for low carbon steels are composed of either hydrochloric acid or sulfuric acid or mixtures of the two. Sulfuric acid is sometimes preferred because of its lower cost, but hydrochloric acid has the ability to dissolve rust and scale much more readily, having a much quicker action for a given concentration and temperature. Ferrous chloride is much more soluble than ferrous sulfate. In general hydrochloric acid gives a more free rinsing, smut-free and brighter finish than does sulfuric acid. It will tolerate, without detrimental effects, a much larger amount of dissolved iron than will sulfuric. However, one serious disadvantage is that the hydrochloric acid is quite volatile and very corrosive to equipment in the plating room and the use of high temperatures is wasteful.

Hydrofluoric acid is sometimes added to either sulfuric or a hydrochloric acid to remove molding sand from cast iron or sand from the surface of sand blasted steel. Nitric acid in small quantities has beer used with sulfuric acid to aid in the removal of oxides that could not be satisfactorily removed with the sulfuric acid alone.

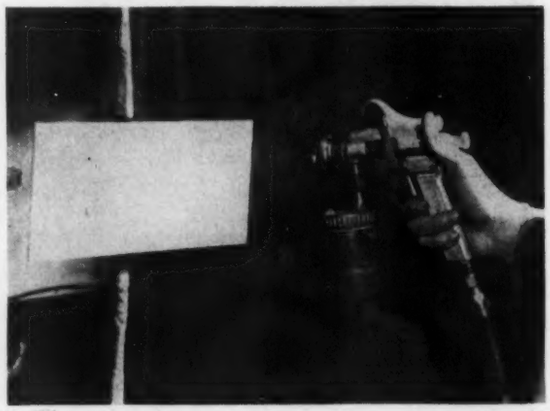
Most acid dips for light rust or scale removal are used at room temperatures. Pickling solutions for the removal of heavy rust and scales are generally used at elevated temperatures. Sulfuric acid pickling solutions are usually operated at 150° to 190°F. The speed of pickling increases greatly with the temperatures of the pickling bath, doubling its speed with every 14° to 17°F rise in temperature.

Pickling inhibitors, which are quite generally used in heavy pickling for scale removal, are not generally used in acid dips. There is little need for an inhibitor as the article to be electroplated is in the acid dip for so short a time that there is little chance for acid attack, and there is some danger that the inhibitor will not be completely rinsed from the surface of the metal and will prevent good adhesion of the subsequent electrodeposit.

Electrolytic pickles are used as a substitute for acid dipping prior to electroplating as well as for removal of heavy rust and scale. They are far more rapid in their action than still pickling solutions. Both anodic and cathodic processes and combinations of the two are used. Anodic electropickling is usually preferred because it does not cause hydrogen embrittlement. The solutions used may be composed of sulfuric acid, chromic acid, oxalic acid, and mixtures of chromic acid and sulfuric acid.

The Madsenell process, the Hanson-Van Winkle-Munning electrolytic Brite Dip, the Bullard-Dunn descalding process, and the Ferrous Pickling System are patented processes which are being used to some extent prior to electroplating.

In general, hydrochloric acid will give the best results for the greatest variety of conditions. Electropickling solutions as well as other types of acid dips sometime offer many advantages for cleaning cycles where large volumes of parts having a similar surface condition are to be processed.



Corrosion resistant coating being applied to test panel.

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Acid Dips for Copper Alloys

In the manufacture of parts of copper and copper base alloys it is sometimes necessary, between drawing operations, to anneal the metal, according to B. H. McGar, assistant director of research, Chase Brass & Copper Co., Waterbury, Conn., in a paper entitled "Acid Dips in Cleaning Cycles for Copper and Copper Base Alloys." In doing so, metal oxides are normally formed. In order to remove the oxides the articles are usually pickled or cleaned in a solution composed of approximately 10 pct sulfuric acid and 90 pct water (by volume) used at about 125°F. The surface of the metal so treated has a dull appearance and occasional red stains occur on the copper base alloys. An effective way to remove the red discoloration and to brighten the metal is to dip the parts after pickling, without rinsing, into a sodium bichromate bath made of the same sulfuric acid concentration used for pickling, with the addition of ¼ to ½ lb bichromate per gal of solution. This bath should be used at approximately 100°F.

As sodium bichromate is fairly expensive and sometimes difficult to obtain, a satisfactory substitute would be welcome. About the best offered is anhydrous ferric sulfate, sometimes sold under the trade name Ferrisul. A 5 to 10 pct sulfuric acid solution by volume is used, together with ½ to 1½ lb of ferric sulfate per gal. It is important that all of the ferric sulfate be in solution, and that the bath be used at approximately 150°F.

Scale and fire-off dips together with nitric-sulfuric acid bright dips are used in order to obtain a bright finish on the articles.

Two bright dips that have somewhat different compositions which have been used successfully are made up as follows: (1) 40 pct sulfuric acid, 20 pct nitric acid, 40 pct water and (2) 60 pct sulfuric acid, 25 pct nitric acid, 0.25 pct hydrochloric acid, balance water. All proportions are by volume.

Aside from the matter of what is the best bright dip to use, there is the question whether it is necessary to add soot to the dip. Some operators believe it is essential in order to obtain a uniform bright finish and to prevent the formation of a cloudy or smoky appearance on the surface of the metal. There is also the added question of wood versus coal soot. Both have been found satisfactory.

The method of using soot consists of placing two handfuls in a 40-gal crock containing a freshly made dip at the end of the day, then stirring it well with a wooden paddle the next morning, when the dip is ready to be used.

Scrapers Made With Carbide Tool Tips

SCRAPERS tipped with carbide are used for reconditioning and original finishing of machine tool slides, bearings, lathe ways and other machine applications. Standard Carboloy cemented carbide blanks can be brazed to old files, both round and flat, then ground by hand to desired shapes. Carboloy grades 905 and 883 are used because of their high abrasive resistance and toughness.

These improvised carbide scrapers, shown in accompanying illustration, lasted many times longer on both round and flat work than the scrapers formerly used. The carbide scrapers not only save an appreciable amount of grinding time, but also maintain a clean, sharp edge for a much longer time. They show no tendency to scratch or gouge the surface as did the sharpened files formerly used.

A 4° negative rake, ground on the tips with a 220 grit diamond wheel, eliminates any tendency of the scrapers to jar or chatter. In addition to the specials that can be made up by brazing standard tips to old files or chisels, there are also standard straight scrapers available.

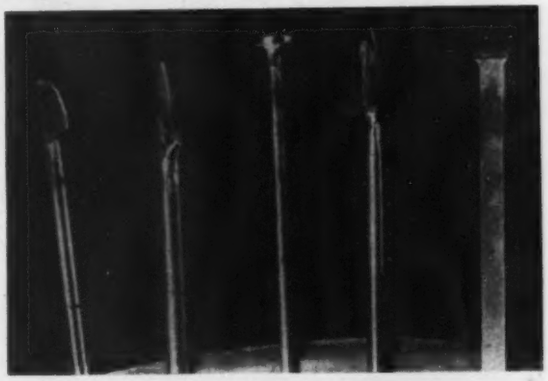

FIG. 1—A few of the scrapers improvised by brazing standard carbide blanks to old files and grinding the blanks to the desired shapes. Such scrapers are used for scraping both flat and cylindrical surfaces.

Parts Finishing at Yale and

Facilities for finish application at the new Philadelphia plant of Yale & Towne Mfg. Co. have been planned to accommodate the wide variety of parts used in industrial trucks, hoists, scales and related products. The types of spray booths and cleaning equipment used, which have been chosen to fit the size and character of parts and assemblies handled, are illustrated.

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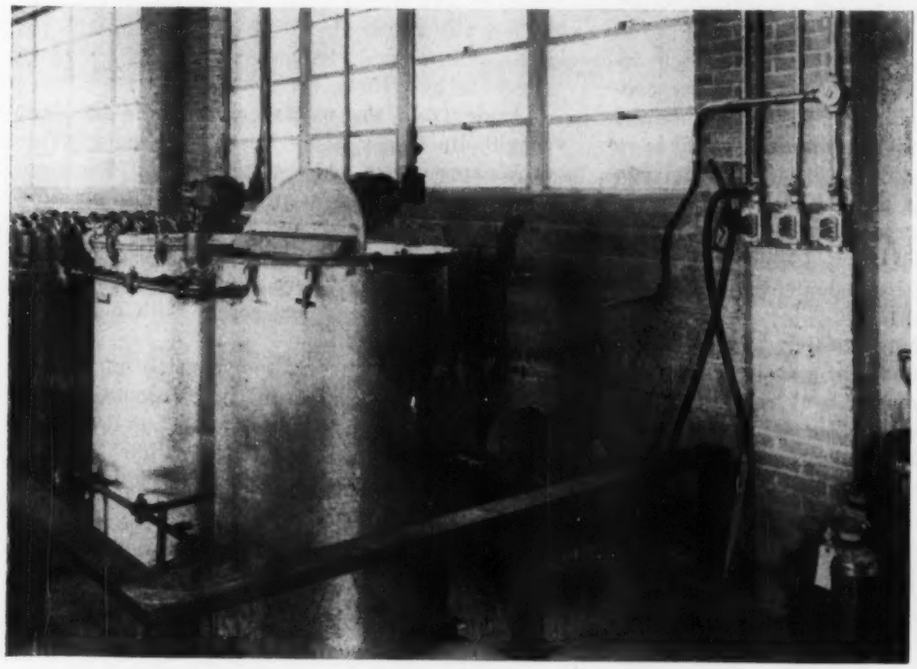
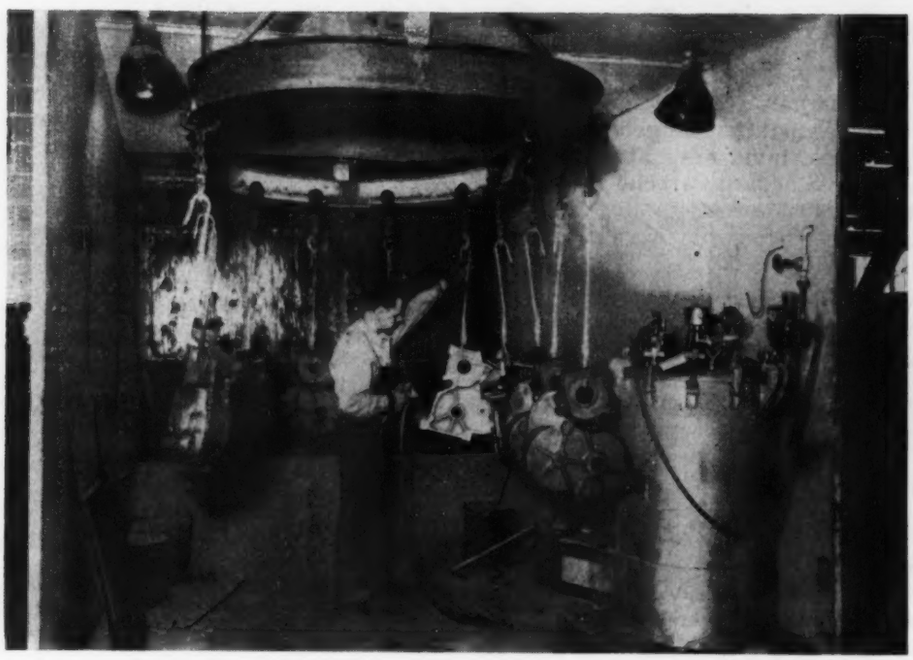
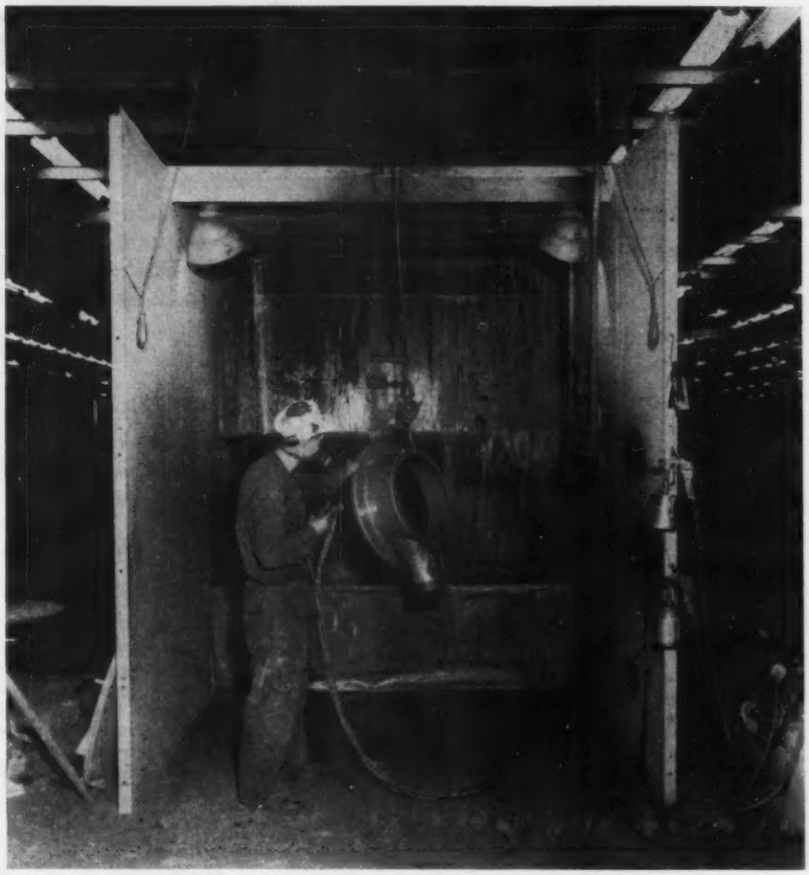


THE standard orange-colored enamel used for the final finish on many products is prepared in these two 125-gal mixers and is piped through 3200 ft of 1¼-in. copper tubing to the various spray booths. This helps maintain uniform specific gravity of the enamel and, as a result, uniform finish on the products.



APPLICATION of an orange, zinc chromate, synthetic prime-filler to castings, before machining, is done in booths such as the one shown. This particular booth was especially designed for the larger castings which can be suspended from trollies and moved along on an overhead conveyer past a water curtain where the spraying is done. Smaller castings are sprayed on trays and are shifted by hand.

Towne



CASTINGS for an industrial scale case are given a special gray filler that is air dried 2 hr and then sanded before receiving the final Hammertone finish. The two components of the latter finish, as shown, are drawn from a divided container and are mixed at the spray gun producing a slightly mottled coating. This finish is baked for 15 to 30 min at 275°F.

CASTINGS that receive the regular orange, zinc chromate prime-filler are machined and then cleaned in the four-stage washer shown. The first stage is a hot alkaline spray that removes oil and foreign matter picked up in machining. This wash does not affect the primer and is rinsed off with cold water in the second stage. The third stage is a wash in Banox solution (1 oz per gal) at 80° to 90°F. This phosphates exposed areas, including those machined, tending to make these surfaces rust resistant and to provide a good paint base. The final stage is a hot water rinse to set the phosphate and allow fast drying of the part as it leaves the machine. The machine cycle requires 6 min.

Gas-Metal Reactions

By

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and

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Loyola University, Chicago

SUMMARY: Corrosive action of various gases often neutralizes the ability of an alloy to retain high mechanical strength at elevated temperatures. The authors discuss herein an investigation of gas-metal reactions where the products of interaction are nonvolatile and form scale on the surface of the metal. Utilization of X-ray, electron diffraction, radioactive tracer and electrical methods in studying reaction products is described, and techniques for measuring gas-metal reaction rates are explored.

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ONE of the major metallurgical problems today is the development of alloys resistant to the corrosive action of various gases at high temperatures. Mechanical strength at high temperatures usually receives first consideration, but high mechanical strength alone offers no advantage if the metal is rapidly destroyed by chemical action. Such failure may be caused by direct temperature influence upon the metal phase structure by surface, chemical, intragranular or intergranular attack.

Metals can react with gases in various ways. First, the products of interaction can be either volatile or not. Volatile products obviously cause a detrimental attack and rapid destruction of the metal phase. Examples are tungsten at temperatures over 1470°F in an oxygen-containing atmosphere,[1] or iron in chlorine at 570°F or higher. However, nonvolatility of reaction products alone does not guarantee sufficient resistance of the metal to its environment. Nonvolatile products form a scale on the surface of the metal, and the behavior of this scale substance may determine the further course of the reaction.

Two special cases may be considered. First, if a reaction proceeds under widely varying temperatures, the mechanical properties of metal and scale, adherence of the scale to the metal and the relative thermal expansion of metal and scale become important, and the shape of parts under attack may play an important role. The second case exists where a reaction is already proceeding at a rate sufficient to cause considerable accumulation of heat so that either metal or scale melts and the reaction becomes violent; for example, iron burning in oxygen.

More general is the case where, at constant temperature and reasonably slow reaction rates, the scale acts as a barrier hindering mutual access of metal and gas. Here, according to Pilling and Bedworth,[2] two general cases may be distinguished: The specific volume of the scale formed is smaller than that of metal phase consumed, or the reverse. In the first case, generally the scale cannot cover the metal surface efficiently, and the reaction is hindered only partially. The amount of attack is directly proportional to the time elapsed, and, therefore, this form of metal-gas reaction is said to follow a linear or rectilinear time law. However, if the specific volume of scale formed is larger than that of metal phase consumed, the scale forms an effective barrier between the metal and gas. Reactants have to get into the scale and diffuse through the scale. Consequently, the processes at both scale-gas and scale-metal interfaces, and the process of diffusion through the scale become rate-determining. This gives rise to the parabolic, logarithmic and asymptotic growth laws[3-9] illustrated qualitatively in fig. 1. Some other specific forms of attack have been reported in specific cases.[10-13]

As a rule, scale growth may proceed by one or both of the following sequence of processes.[14] The gas is absorbed on the surface of the scale, and the gas molecules dissociate to form atoms, which may eventually ionize to form ions, and the atoms or ions so produced arrive at the scale-metal interface, where they react with the metal. Again, metal atoms or ions may dissolve in the scale and diffuse to the surface, where they react with the gas atoms or ions and form an extension of the scale. The controversial issues as to whether oxygen or metal diffuses through the scale, whether the diffusing component moves in the form of atoms or ions, and which step in the sequence of processes is the rate-determining one, have been considered at some length from both the experimental and theoretical viewpoints.[6, 15-21] Wagner's ionic diffusion theory[19, 22-24] and its logical corollary,[25] state that there should exist an experimentally measurable electrical potential difference between the metal and the surface of the scale.

The rate-determining step in scale growth has been shown to be governed, not only by the diffusion process through the scale, but also by diffusion through thin layers of gas adjacent to the metal surface. For example, in air or some other mixture of oxygen with an inert gas, nitrogen accumulates close to the surface, and the scaling is retarded by a blanket of nitrogen, through which the oxygen must diffuse to reach the scale. It is thus observed that the scaling rate increases in some instances with increase of the velocity of the gas mixture past the surface by as much as 400 pct, up to velocities of the order of 50 fpm, beyond which there is no further change.[26-28]

The development of stresses in scales has been considered from the viewpoint of the Pilling-Bedworth ratio and from other angles. For example, if thin growing scale layers are investigated, it is often found that the underlying phase imposes its lattice structure upon the thin overgrowing layer of the new phase.[29-31] To achieve this, however, the new phase has to suffer stresses,[32] and as soon as it is thick enough, the orienting effect breaks down, and the more distant layers of the lattice pass into their more natural lattice structures or into disoriented crystal aggregates. The process is accompanied by changes in volume with consequent development of stresses. The role of scale blistering and cracking in altering the reaction rate of scale formation has been considered.[9]

The effect of disorder in the crystal lattice on scale growth rate and the indirect effect of gas pressure have been taken up in the literature.[20-22] It may be said, with a fair degree of accuracy, that the *mobility* of ions and electrons will change only slowly with change of pressure and that the effect of pressure change on the reaction rate is due to the change brought about in the *number* of ions and electrons capable of migration. The argument is illustrated by consideration of the case of cuprous oxide scale on copper.[16, 20]

The role of impurities in the gas and on the metal surface on the rate of scaling have been considered.[11, 33, 34] That small amounts of impurities in the gas can change the rate very considerably may be shown by the effect of small amounts of chlorine present in oxygen gas and the effect of the latter on brass. It has been reported that brass is not affected by dry sulfur dioxide present in air or oxygen. However, if the chlorine concentration exceeds 5 parts in 10,000, the oxidation can be accelerated as much as 500 pct.[35] The effect of impurities on the metal surface, on the scaling rate, is illustrated by the behavior of single crystals on oxidation, and by the results of zinc oxidation carried out on surfaces prepared in a variety of ways.[36]

The effect of increase in temperature on scaling reactions may be to produce larger numbers of mobile atoms and ions per unit volume of scale lattice: It can make each migrating atom or ion more mobile; the overall free energy change in the reaction can change; and last but not least, many secondary factors may contribute in influencing the rates of reaction. Shifts in the rates of recrystallization may be mentioned as an example. Still more important is the case where the temperature rise crosses the temperature boundary of the stability field of some solid phase. For instance, a sharp increase in the rate of oxidation of iron is observed at about 1020°F where the FeO phase appears in the scale. The FeO lattice is much more easily penetrated by iron ions than are other iron oxide lattices. On the other hand, the transition in the metal phase has only a small influence on the rate of oxidation.

Phase Diagrams at Boundaries Important

On surveying the factors acting in scaling processes, either in the form of a short summary, as above, or in longer studies based on a thorough survey of the literature, one can hardly escape the conclusion that the present knowledge of solid oxide and sulfide phases, their mixtures and mutual solid solutions, is in most cases inadequate even to justify well-founded speculations. In cases of scale growth and diffusion through solids, the sections of phase diagrams at boundaries between two phases, for instance, at the transition between iron and ferrous oxide, are most important. The sharper the boundary is at coexistence of both substances, the less is the mutual solubility, and the smaller is the concentration

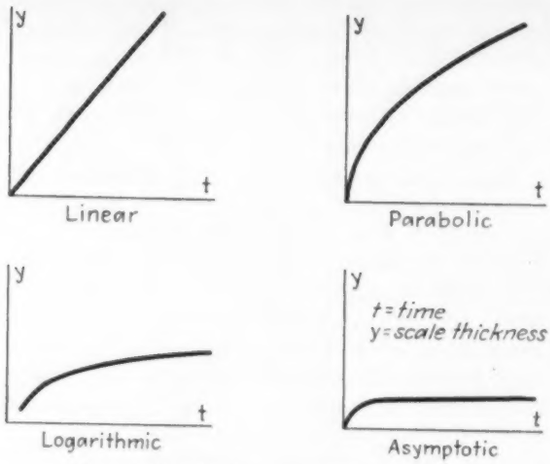

FIG. 1 — Graphical representation of the four laws governing scale growth in gas-metal reactions.

gradient that can be built up in a layer of substance. The knowledge of these transition regions is rather poor, and only rough approximations can be extracted from the literature. Even less is known about the kinetics of phase formation.[37, 38]

The following extract from a summary (an unpublished paper by the authors) on the importance of the phase changes in scaling reactions may illustrate the situation in connection with probably the most intensively investigated system, namely, the iron-iron oxide system:

"The change in the phase composition of metal or film can influence the rate of growth. In the simplest case, that of parabolic thickening, the rate constant which is dependent on diffusion coefficients or mobilities of ions will change with change in scale composition. If a change in phase of the metal takes place, the amount of energy needed to transfer metal ions and electrons to the film or the free energy change of the film-forming reaction will be changed. In more complicated cases, a change to another growth law can occur.

The influence of a change in metal phase has been demonstrated by Fischbeck, Neundeubel and Salzer[39] in the case of the oxidation of iron. The oxidation rate increased with increase of temperature up to the transition point, α-iron to γ-iron at about 1670°F. Then, with further increase in temperature, the rate suddenly decreased in a narrow temperature range, starting to increase again after a short temperature interval was passed. According to Fischbeck, the resistance to the diffusion at the phase boundary metal/oxide was changed at the transition point. According to Lustman[40] the change in oxidation rate can be attributed to the change in the work function for the electron transfer from metal to oxide.

The influence of a change in the phase composition of the scale has been studied by Arkharov[41] for the case of iron. Hatfield[42] found that 930° to 1110°F is the temperature range below which the temperature coefficient of the oxidation rate is smaller than above it. Jenkins[43], Upthegrove and Murphy,[44] Siebert and Upthegrove[45] and Siebert and Donnelly[46] found a correlation between the structure, and between the ferrous iron content of the scale and the rate of oxidation. Arkharov[41] proved by means of an X-ray investigation that the change in the temperature coefficient of the oxidation rate always occurs as soon as the FeO type lattice (cubic NaCl type) appears in the scale. The critical temperature at which the change was observed was different for different steels. All steels contained small amounts of alloyed metals. The temperature was about 1020°F for pure iron (the lowest temperature at which FeO is a stable phase is 1060°F) and as high as 1515°F for one sample of steel. The data were in agreement with data by Benard[47] on phase diagrams of binary oxide mixtures. Benard's curves predicted the rise of the lowest temperature limit stability of the cubic type FeO lattice with introduction of alloying elements into iron.

More recently Gulbransen and Hickman[48] demonstrated by means of electron diffraction studies that the FeO phase appears on pure iron at 840°F if the films are thin, and at 930° to 1110°F for the case of thicker films.

Arkharov considers that the cubic type of lattice is much more permeable to diffusing ions than the Fe_3O_4 spinel-type lattice, which is stable below 1060°F, that is, in the temperature range where FeO cannot be formed. This conclusion is in accordance with the opinion of other workers, Hickman and Gulbransen,[49] Chalmer and Quarell,[50] who considered the spinel-type as the characteristic one for the formation of protective films on metals.

The rapid oxidation of iron in water vapor,[51, 52] seemingly a contradiction in view of the low oxygen concentration, is caused by the circumstance that the scale, because of lack of oxygen, consists mainly of FeO. Ordinarily, iron scale consists of three layers: FeO, Fe_3O_4, and Fe_2O_3, the latter two being much less permeable to the diffusion of iron than FeO (see Fischbeck, et al[39, 51]).

The permeability of different lattice types is a very important factor in the determination of film growth rate, and, therefore, all factors which change the phase composition (temperature, pressure of the reacting gas and the presence of other elements) will change the corrosion rate."

This summary amply demonstrates that the key to a successful study of gaseous corrosion reactions lies in painstaking research on the phase behavior and phase interaction in the corresponding metal-gas systems.

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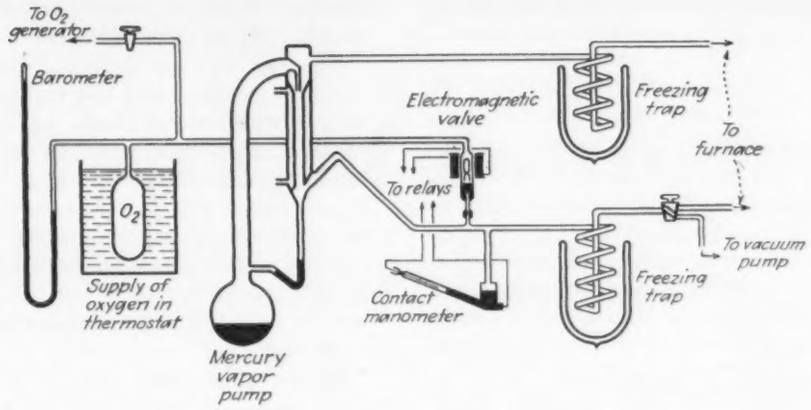

FIG. 2—Dynamic volumetric system used by the authors in conducting oxidation experiments at several millimeters pressure. Oxygen is circulated by a mercury vapor jet pump and freezing traps are used to isolate the mercury vapor from the specimen in the furnace.

The techniques used in the investigation of gas-metal reactions can be classified into two groups: (1) Techniques designed to prove or disprove some fundamental theoretical and practical questions and to study phenomenological aspects of reactions; and (2) techniques designed to follow rates of reactions.

As set forth above, the road to a thorough understanding of gas-metal reactions leads through a knowledge of reaction products. The behavior of the products has a profound influence on the rate of the reaction. At present, investigators often do not even know what the reaction product is in many cases, let alone having a knowledge of its behavior. Therefore, the methods, of which there are several, designed to recognize various solid phases and their mixtures, are of utmost importance.

Chemical analysis is the most conservative, but is still a powerful means; however, it will almost always be necessary to use micromethods, and the precision must be high as usually the differences in composition, i.e., between various mixtures of oxides and mutual solid solutions of oxides, are small. However, the chemical analysis cannot always tell definitely whether the object is merely a mixture of oxides, a solid solution, etc. The criterion of existence of a compound in the solid state is the property of possessing a definite crystal lattice. A compound acquires full citizenship in the chemistry of solids only if it can produce a more or less characteristic X-ray pattern. Therefore, an X-ray investigation of scales formed in gas-metal reactions should never be omitted. The X-ray technique can even be used as an analytic tool.[53]

X-ray methods can be applied to the scale after the removal of the scale from the surface of the metal or by using a back-reflexion camera directly on the scale while it is still located on the metal. X-ray patterns yield information on the structure of a layer of a certain depth (up to 0.001 in.) of the substance subjected to investigation. So far, X-ray patterns have only been taken using the specimens removed from the direct locus of the metal-gas reactions. Scales were investigated at room temperature and in atmospheric air. There is always some uncertainty as to the extent of the change the scale undergoes in chilling and being removed from the locus of the reaction. X-ray studies on scales, while they are growing at high temperatures in different gases, are still a challenge to the experimentalist; however, only a few adjustments and changes would be necessary to adapt high-temperature X-ray cameras to this purpose. Undoubtedly, experiments of this kind will prove fruitful in gaseous corrosion work.

Electron diffraction technique permits the investigation of the thin outside layer of the scale, up to about 150 A in thickness. This interesting technique was widely employed by Phelps, Gulbransen, and Hickman.[37, 54] They have carried out many excellent investigations on thin scales formed on metals and complex alloys at low (1 mm) oxygen pressures, taking electron diffraction patterns *in situ*, at the temperature of scale formation, and only after removal of oxygen from the gas phase.

The voluminous tables of data obtained in this way are of great interest to every investigator of scaling reactions and bring to light many unexpected facts, such as the existence of definite oxides under conditions where they have been supposed to be unstable. On the other hand, the data also show, as stressed by the above investigators themselves, that the method has very definite limitations of an inherent nature, namely: The patterns and lattice constants derived from them are in many cases

indistinguishable between several compounds. One can mention, as an example, the case of $NiO.Fe_2O_3$ and $FeO.Cr_2O_3$, which both possess a spinel-type lattice and lattice constants of 6.34 and 8.35 respectively, with unknown limitations regarding some intermediate structures.

Studies on the change of lattice constants with change of gas pressure are, at present, impossible by electron diffraction technique, both because of insufficient accuracy in electron diffraction technique and because of the necessity of working in vacuum. The X-ray technique is much more suited for the purpose.

Dissociation Pressure Technique Promising

The critical microscopic examination of scale cross-sections, embedded in plastic and eventually etched, is a routine method of wide application and has supplemented many studies of scales.[55]

There is one method of identification and investigation of the properties of oxide scales, which, so far, seems to have been unduly neglected. Schenck and his coworkers in Germany, by application of a method involving successive reduction or oxidation, have been able to obtain interesting results on the phase equilibria in many metal-oxygen and metal-sulfur systems. The dissociation pressures of oxides or sulfides, measured indirectly by these methods, serve as identification for the existence of definite phases and solid solutions. It is very likely that the same technique, applied to the investigation of complex scales, may prove a powerful tool in the characterization of phase conditions.

So far, the methods which have been briefly mentioned serve to depict a momentary set of conditions and phases existing in a scale at some particular moment.

Other methods serve to detect the direction and velocities of changes occurring during scaling reactions. The most important matter is that of finding the directions of scale growth, the nature of the component diffusing through the solid and the rates of diffusion through the solid.

The tracer technique is a favorite one with chemists today, and one would be surprised if this technique had not yet found application in the investigation of gas-metal reactions. There are several applications known. A copper specimen has been plated with radioactive copper, oxidized, the scale removed in successive layers and investigated for radioactivity.[56] Thus the fate of copper atoms forming the surface of the metal was followed, and an agreement with Wagner's picture of copper ions migrating outward was found. It is to be hoped that similar experiments on other metals will be performed soon and the results published; they will remove much of the uncertainty concerning the question whether metal or oxygen diffuses through the oxide in other cases.

Another way of applying the tracer technique is to study how the oxides exchange the oxygen with the gas phase. The technique calls for the use of the mass spectrograph to give the abundance ratios. Obviously the kinetics of the exchange will provide a valuable clue as to the mobility of oxygen in the lattice of the oxide. The technique has been applied recently in studies on oxides,[57] but the correlation of results with the process of scaling has not yet been done.

Electrical methods might constitute a separate chapter in this list of techniques. Firstly, transference experiments, the methods of which were first developed by Tubandt, can, in some cases, give direct values of the transport numbers of ions in solids and also tell which ion is migrating. Unfortunately, for most of the metal oxides the ionic transport numbers are very low. A very large number of coulombs has to be passed through the specimen of oxide before even minute changes in composition of the specimen along the path of current can be detected. Transference experiments will generally be impractical in the case of oxides; the only oxide to which the method has been applied is cuprous.[58]

Two other electrical methods have been studied by Wagner. The method which involves a metal-metal oxide thermocouple is intriguing and has yielded interesting data in the determination of the disorder form prevalent in the lattice of oxides.[59, 60]

Use of Conductivity Method

The conductivity method can be employed in cases where the conductivity of the oxide substance changes with the gas pressure.[59, 61] A strip of oxide is placed in the experimental space, and the conductance measured after everything has come to equilibrium. If the oxygen pressure is suddenly changed, the conductivity of the oxide strip will also change. The conductivity of the strip will not change at once because time is required for the new equilibrium to extend through the lattice. This can occur only by diffusion of oxygen or metal ions or atoms. Therefore, a "time v. conductance" curve after a sudden change of oxygen pressure gives information on the diffusion rates through the lattice.

The measurements of the potentials developed across growing scales is another example of electrical investigations as applied to scale growth.[16, 17]

All references associated with this article will be included in the second part of this article, to be published next week—Ed.

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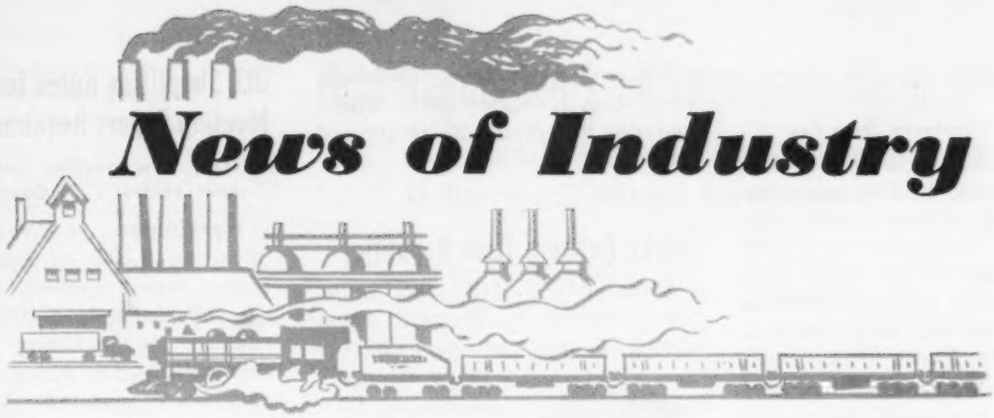

The Investor Speaks

New York — The George Putnam Fund of Boston, a mutual trust fund with assets of over $31 million, last week sent this telegram to the Presidential steel fact-finding board meeting here: "Your fact-finding board has heard labor's story. You have heard management's. What about the investor's . . . the 13,000 shareholders of this fund? Do you realize that in 6 of the past 20 years the owners of the great U. S. Steel Corp. received no income and that during the prosperous year 1948 they received 30 pct less than in 1930 and 40 pct less than in 1929? This in spite of the fact that U. S. Steel produced more tons of steel in 1948 than in 1929 and provided employment for more people and paid two and a half times as much in wages and salaries."

Russia Ships Manganese

Washington—For the first time since March, exports of manganese dribbled into the United States from Russia with receipts of $100,000 worth in June, according to June trade summaries by the Census Bureau.

Some $600,000 worth was received in March.

How Long Will the Steel Zephyr Last?

Many steel men see low of 65 pct this year . . . Decline predicted for November but some buyers are now more optimistic than they have been—*By TOM CAMPBELL*

Cleveland—The favorite subject in steel circles for the past 3 weeks has been "How long will the little zephyr in steel business last?" Most answers show some steel people are over-cautious—or just plain conservative.

In February when steel demand was shrinking fast in the hinterlands, top steel sales offices knew little about it. The contraction was obscured by the high operating rate and big backlogs.

It took heavy cancellations, a drop in new business and a decline in the operating rate to focus attention on the state of steel. The drop in demand was generally recognized between the end of May and mid June.

A cross-section of opinion in steel sales offices a few months ago leaned toward a low of 75 pct in the fourth quarter. Because of lean order books in June and part of July more pessimism entered the picture. Many now think 65 pct will be the low in the last part of the fourth quarter.

Steel Men Cite Reasons for Dip

This week several key people in steel privately gave the following reasons for looking towards a contraction of the current small but certain pickup in orders: (1) Inventories were cut too far—they will be built up to needs by November; (2) construction orders are up seasonally and will be off again in November; (3) fears of steel strike caused considerable buying which will be settled one way or the other by October, and (4) auto buying seems too good to be true.

But because steel sales people believe 65 pct is coming and orders will contract does not make it certain. The operating rate may not go that low. And buying may not be based upon such flimsy reasons. People in the field believe there is a chance the steel business will be bolstered up to December by: (1) Longer delivery schedules; (2) small chance of price weakness; (3) the inflationary shot in the arm; (4) better consumer buying; and (5) realization that we are on a higher level of activity for some time.

Sifting out all opinions here is

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Gross National Product Slips

Washington—The gross national product declined from an annual rate of $262 billion during the first quarter to $256 billion in the second quarter, according to the Office of Business Economics. Decline was largely due to a leveling off of business inventories.

Steel Zephyr

Continued from Page 87

a guess based on interviews during the past week: (1) The operating rate will hold up until late November or early December; (2) it will dip seasonally at the year end; and (3) it will pick up speed in late February and may reach a minor peak in March 1950.

But from the consumer side of the picture warehouse, appliance, auto and construction people see a sustained steel demand, interferred with by usual seasonal factors, with no deep slide off to anything like an average of 50-pct operations. They base this on inflationary trends, money in the bank and overall demand.

More Freight Cars Retired Than Were Built During July

New York—During July freight cars were retired faster than they were built. This is true in spite of the fact that more new locomotives and freight cars were placed in service during the first 7 months of 1949 than in any corresponding period during the past 25 years.

The reason for this apparent paradox is that car building has slipped sharply since the early months of this year. During July 5328 new freight cars were placed in service. But only a few months ago cars were being produced at a rate of more than 10,000 per month.

During the first 7 months of this year there were 60,486 new freight cars placed in service. In the same period of 1948, there were 58,892 put in service. There were 45,381 cars retired during the first 7 months of the year. Freight car backlogs, as of Aug. 1, totaled 36,564.

During the first 7 months of the year 1157 new locomotives were built. These included 1112 diesel and 45 steam. In the same period of 1948 new locomotives totaled 762, of which 730 were diesel, 28 steam and 4 electric. Backlogs, as of Aug. 1, totaled 1009. These included 980 diesel, 25 steam and 4 electric.

Clarke Retiring from Republic

Cleveland—N. J. Clarke, senior vice-president of Republic Steel Corp., will retire on Dec. 31 of this year after 52 years in the steel industry He will be succeeded by W. M. Kelley, who has been in charge of manufacturing divisions of the corporation for the past 4 years.

N. J. Clarke

Mr. Clarke began his business career in 1897 at the age of 14 as an office boy and before he was 30 became secretary and sales manager for Upson Nut Co. Shortly after Republic Steel was organized in 1930 he accepted the job of sales vice-president and in 1939 he became a director of the corporation. He was elected senior vice-president in 1945.

OIT Simplifies Rules for Meeting Export Requirements

Issues new positive list of items under control . . . Covers licenses

Washington — A simplified "Positive List" of commodities under export control, issued by the Office of International Trade, contains in a single table all commodities for which export licenses are required. It also indicates the destinations for which licenses are needed to export each commodity and maintains existing export license requirements for all strategic and short-supply items.

Under the new system, any commodity which is not listed on the simplified Positive List may be exported to any destination, and in any quantity, without the necessity of applying for a license. Many listed commodities require licenses for shipment to Group R destinations only. All such commodities (indicated on the new Positive List by the letter "R") may be exported freely to all other destinations under general license.

Since validated licenses are no longer required for commodities

GOOD PLUG: This native Zulu is violating several safety rules, but he certainly makes a good hot-weather plug for Cleveland Crane & Engineering Co., makers of the shear he is operating. The operation is in the plant of Steel & Power Products, Ltd., Johannesburg, South Africa.

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not on the Positive List, OIT will discontinue publication of a separate list of commodities which can be shipped license-free to all destinations. Removal of any item from the simplified Positive List will now automatically indicate that it may be exported under general license to any country.

In establishing the new Positive List, OIT removed the validated license requirement from a large group of commodities, ranging from foods and textiles to machinery and photographic equipment. These commodities, several hundred in all, are of a non-strategic character and are in may now be shipped to all destin- plentiful domestic supply. They ations under general license.

NYU Offers Course In Metallurgy

New York—A new course in "Metallurgy of Iron and Steel" will be offered this fall by the Graduate Div. of New York University's College of Engineering.

The course will include a survey of steel producing methods, the technology of alloying and heat treating and the applications of various steels.

Firm Begins Work on Yugoslavia Steel Mill

A $3 million slabbing-blooming mill to be completed in 10 months . . . Mill will boost Yugoslav rail production.

Pittsburgh—A Pittsburgh firm has begun work on a $3 million slabbing-blooming mill for Yugoslavia, a project viewed as another move by the U. S. government to cement relations with a European nation within the Russian sphere of influence that, to all appearances at least, refuses to dance to Stalin's tune.

Materials for the mill will be produced at the Wheeling, W. Va. plant of the Continental Foundry & Machine Co., and shipped to Yugoslavia for erection there. This end of the job is expected to be completed in 10 months.

Commerce Dept. officials said that export licenses for the equipment will be granted, but it was pointed out that the U. S. reserves the right to amend, suspend or revoke them at any time prior to shipment. Thus, whether the materials are delivered will depend on Yugoslavia-U. S. relations at the time of scheduled shipment.

Since Marshal Tito's rift with Russia became apparent, the Yugoslav leader has been turning more and more to the West and away from Communist influence. The U. S. last April eased the ban on some exports to Yugoslavia.

Even so, U. S. government permission to Yugoslavia to purchase the mill materials came only after lengthy discussions between the State Dept. and officials of military departments. Defense Secretary Louis Johnson was said to have yielded only with the understanding that the project will be reviewed before the materials are shipped. The military is understandably reluctant to approve any project that might enhance a potential enemy's war machine.

Yugoslav officials said the mill was needed to help boost production of rails and intermediate processing of steel for use in manufacture of mining equipment.

The transaction was said to be a cash one.

French Order Equipment

The Yugoslav arrangement came on the heels of another announcement that has made Pittsburgh area mill equipment manufacturers quite happy. Earlier last week, it was revealed that an association of French steel firms had signed contracts for nearly $50 million of machinery and auxiliary equipment. Most of this will be supplied by Pittsburgh manufacturers.

The French deal involves a six-stand continuous hot strip mill with an annual capacity of about 800,000 tons to be built by the United Engineering & Foundry Co.; a cold strip mill to be built by the Mesta Machine Co., and $9.5 million worth of electrical

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WATCHFUL EYES: K. C. Gardner, left, president of United Engineering & Foundry Co., and J. M. Misset, assistant to the president of Sollac, a French concern, watch as Raymond Colmant, director of Sollac, signs contract for new ECA-financed 80 in. hot strip mill. Under a similar arrangement Mesta Machine Co., will build a cold strip mill for sheets and tinplate. Westinghouse Electric Corp. will supply electrical equipment for both mills. General Electric Co., is to build a power plant. The French contracts involved nearly $50 million.

Foreign Mill Equipment

Continued from Page 89

equipment for both mills, to be supplied by the Westinghouse Electric Corp. Delivery is scheduled within 20 months.

Largest of their kind to be arranged thus far, the orders with Sollac, a privately-owned association of nine French steel firms, are being financed through the Economic Cooperation Administration. Sollac will spend an additional $84 million in construction of a new steel plant in northern France.

Varied Technical Program Offered by ASME at Fall Meet

Erie, Pa.—A varied technical program will be offered by the American Society of Mechanical Engineers at its fall meeting, Sept. 28-30, here. Fifty papers will be presented during 21 technical sessions sponsored by 16 professional divisions of the society.

Papers will be given in such fields as management, power, heat, transfer, production engineering, metals engineering, machine design, fuels, industrial instruments and regulators, aviation, gas-turbine power, materials handling, petroleum, railroad, rubber and plastics, and education.

Inspection trips to Talon, Inc., American Locomotive Co., General Electric Locomotive Div., GE Refrigerator Div., American Sterilizer Co. and Erie Forge and Steel Co., have been arranged to round out the program.

Invite Manufacturers' Exhibits

Baltimore — The Purchasing Agent's Assn. of Baltimore are again sponsoring their Annual Manufacturers' Products Exhibit. This year it is to be held Oct. 11-13 at the Lord Baltimore Hotel.

A feature of the exhibit will be the awarding of prizes for the most informative, as well as the most attractive and decorative booths.

Steel Costs Soar on Rail Rate Increases

Freight rate boosts of past 3 years add $3.50 to cost of making a ton of finished steel and raise average of prices delivered to consumers by $4.00. —*By JOHN B. DELANEY*

Pittsburgh—The successive railroad freight rate increases of the last 3 years have added more than $3.50 to the cost of producing a ton of finished steel.

And steel consumers are no less aware than producers of rail freight cost increases, because the consumer now is paying close to $4.00 a ton more to get this same steel to his plant by rail.

The latest increase, effective Sept. 1, adds 4 pct to rail shipping costs. It is in addition to an interim increase of 6 pct in effect since last Jan. 11. Estimates are that the new rise means an increase in costs of about 50¢ per ton to the producer, and perhaps 25¢ to the steel user.

Since June 30, 1946, rail freight rate increases on iron and steel products figure out to something like 50 pct or more.

RECORD DESCENT: Last week Otis Barton set a world's record in this Benthoscope by a 4500 ft descent into the Pacific, about 27 miles off the California coast just north of Los Angeles. The Benthoscope has an ID of 4½ ft and a wall thickness of 1¾ in. The diving bell was built by the Watson-Stillman Co., Roselle, N. J.

Trucks and Barges Profit

So it is little wonder that steel producers and consumers alike, while recognizing the needs of the railroads for more revenue, have been turning to alternative transport facilities—truck and barge lines—whenever possible. Now that demand has fallen off from its postwar high, and the spread between rates of the railroads and competing carriers grows wider, the rate advantages of the truckers and barge lines become more attractive.

Under F.O.B. mill pricing, the consumer naturally will choose a nearby source of supply to save freight costs, which he has been doing right along when he could. This will become more prevalent in a loose market. Thus increasing inability to compete continues to force producers out of distant consumer areas.

They Have Limitations

The effect will be the same should producers again be permitted to absorb freight costs, because there's a limit to the amount of freight that the mills are able to absorb. The lower rates of the truck and barge lines would make it possible for the producers to hold at least some of these distant markets.

But just how much trucks and barges can offset this trend is any-

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body's guess. They have their limitations, and these carriers themselves are the first to admit it. Some commodities simply cannot be handled by truck, and the disadvantages of the barges include (1) minimum cargo of 500 tons, (2) lack of speed, (3) problem of loading and unloading, and (4) delivery to and from the dock.

There has been a tremendous increase in the use of trucks for transporting iron and steel products in the last several years. The barge lines also report an upturn in steel shipments, particularly on long hauls from Pittsburgh to the south and southwest.

Uses Barges 50 Pct More

One producer is reported to have increased his river shipments 50 pct over 1947. The largest single shipment of steel products ever moved over the Tennessee River—4000 tons of 22-in. pipe from Pittsburgh—passed through the port of Chattanooga last July 29 en route to Harriman, Tenn., for use on a natural gas pipeline job. The seven-barge shipment was the first of some 40 to 50 barge loads scheduled to make the 1497-mile trip.

At a recent Chattanooga Chamber of Commerce dinner, W. J. Sheehan, TVA transportation economist, stated that over 8000 tons of iron and steel products had moved over the Tennessee River in the last several months, as compared to 1000 tons for all of 1948. He added that such shipments this year are expected to reach about 50,000 tons and result in transportation cost savings of about $500,000 over rail freight rates.

Rates Are Compared

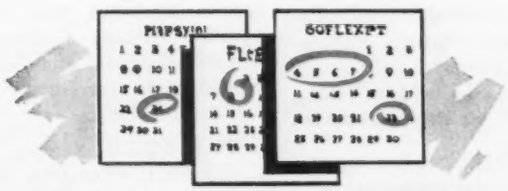
Accompanying is a comparison of rail rates, as effective Sept. 1, compared to bargeload rates (subject to a minimum weight of 500 net tons) on manufactured iron and steel articles between selected points.

Barge line operators are careful to point out that their rates are from port-to-port only. The problem of getting the material to and from the port, and loading and unloading is strictly that of the shipper and the receiver. So these added costs would tend to offset the freight rate advantage of the barge lines. The minimum tonnage and the time factor are other problems. How many consumers have the facilities to store large tonnages, and how many can afford to maintain heavy inventories in the first place?

There are indications, too, that the railroads are attempting to meet this competition in at least some instances. Wesley A. Rogers, general freight agent for American Barge Line Co., pointed out in a recent address that he had learned that the railroads had cut their rate on a commodity now moving by barge to a point where the over-all saving of $3.60 per ton would shrink to 60¢ a ton, thus making it undesirable for the shipper to use barges.

COMPARATIVE FREIGHT RATE
(Per Net Ton)

From	To	Rail	Barge
Pittsburgh	Memphis	$18.26	$3.27
Pittsburgh	New Orleans	20.68	5.51
Pittsburgh	Houston	20.92	7.42
Pittsburgh	Chattanooga	17.82	5.30
Chicago	Memphis	13.86	2.65
Chicago	New Orleans	17.82	4.45
Chicago	Houston	17.66	6.04
Chicago	Chattanooga	17.60	5.30



Dates to Remember

Sept. 12-16	**Instrument Society of America**, conference and exhibit, St. Louis.
Sept. 14-16	**Porcelain Enamel Institute**, annual forum, Columbus, Ohio.
Sept. 18-23	**American Chemical Society**, national meeting, Atlantic City, N. J.
Sept. 25-28	**American Mining Congress**, metal mining convention, Spokane.
Sept. 25-Oct. 1	**American Institute of Mining & Metallurgical Engineers**, midyear meeting, Columbus, Ohio.
Sept. 26-28	**National Electronics Conference**, Chicago.
Sept. 27-30	**American Society of Mechanical Engineers**, fall meeting, Erie, Pa.
Oct. 3- 4	**Steel Founders Society of America**, fall meeting, White Sulphur Springs, W. Va.
Oct. 3- 5	**American Coke & Coal Chemicals Institute**, annual meeting, Skytop, Pa.
Oct. 4- 6	**Industrial Packaging & Materials Handling Exposition**, annual convention, Detroit.
Oct. 10-14	**American Society for Testing Materials**, West Coast meeting, San Francisco.
Oct. 12-15	**Electrochemical Society**, semiannual meeting, Chicago.
Oct. 13-15	**Foundry Equipment Manufacturers Assn.**, annual meeting. White Sulphur Springs, W. Va.
Oct. 17-21	**National Metal Congress**, Cleveland.
Oct. 24-26	**American Gear Manufacturers Assn.**, annual meeting, Chicago.
Oct. 27-28	**Gray Iron Founders Society**, annual meeting, Chicago.
Oct. 27-28	**Porcelain Enamel Institute**, annual meeting, French Lick, Ind.
Oct. 30-Nov. 2	**National Tool & Die Manufacturers Assn.**, annual meeting, New York.

INDUSTRIAL SHORTS

PLEASE COME—THE GOULD STORAGE BATTERY CORP., Trenton, N. J. invites those companies utilizing motive power storage batteries to send their men to a 5-day school on the care, maintenance and charging of the storage battery, to be held Nov. 14-18 at their Trenton plant.

JUMBO CONTRACT—A contract for coil annealing furnaces has been placed by the BETHLEHEM STEEL CO. for their Lackawanna Works. Twenty furnaces and 60 bases are to be built by Surface Combustion Corp., Toledo.

GETTING ACQUAINTED—A council of WILLYS-OVERLAND distributers has been formed to develop closer relations between factory management and the field. Quarterly meetings will be held in Toledo, the first of which is scheduled for Sept. 15.

FRENCH INVASION—Two complete rolling mill installations and auxiliary equipment for manufacturing aluminum foil are being built by HYDROPRESS, INC., New York, for two French companies, Etablissements Charles Coquillard, Froges, and Trefileries et Laminoirs du Havre, Paris. The mills are expected to operate at 3000 ft per min.

ROLLING SPACE—A newly-organized firm in Chicago, the JUDD STEEL PRODUCTS, INC., has acquired manufacturing space in Skokie, Ill., where it will roll steel shapes from coil stocks.

TELEMET—A new steel alloy, telemet, has been developed by ALLEGHENY LUDLUM STEEL CORP., Pittsburgh. The metal, which has the same coefficiency of expansion as glass, will be used to make the cone section of television picture tubes.

NEW MONIKER—Acme Pattern & Machine Co., Inc., Buffalo has changed its name to the ACME-WINTER CORP. New products and developments will be announced shortly.

KENTUCKY REP—Rietze & Co., 139 S. 5th St., Louisville, has been appointed by the STANDARD TRANSFORMER CO., Warren, Ohio, as their representative in the State of Kentucky.

ONCE AGAIN—Edward A. Ross has been reelected president of the WEIRTON INDEPENDENT UNION, INC., exclusive bargaining agent for Weirton Steel Co. production employees. Edward S. McGinnis was reelected first vice-president, Thomas J. Long second vice-president and Arthur L. Matthews secretary-treasurer.

TRY SOME—Sample sacks of Industrial Floor-Dry, a light reflective material with high absorptive ability, are being sent to those requesting them by the EAGLE-PICHER CO., Cincinnati. When spread on plant floors the substance soaks up oil and water while still retaining its appearance and firm granular structure.

TAKING OVER—Controlling interest in Texsteam Corp., Houston, makers of safety relief valves and liquid injector pumps, has been acquired by VAPOR HEATING CORP., Chicago, manufacturers of steam generators. A. J. Loose has been elected vice-president and treasurer of Texsteam and will be in active charge of operations.

NEED ELECTRODES?—The W. P. and R. S. Mars Co., Duluth, has been appointed a distributer by AMPCO METAL, INC. of Milwaukee. They will offer the complete line of Ampco welding electrodes.

Additional German Plants To Be Awarded As Reparations

Washington—Twenty additional German war and industrial plants are to be awarded as reparations in the near future to allied nations, including the United States.

Aug. 26 is the latest date on which the European Branch, Office of International Trade, Dept. of Commerce, will receive expressions of interest in the plants. All letters must be accompanied by justifying data.

With the exception of two plants for production of synthetic ammonia, the remainder contain general purpose equipment and were facilities of the widespread Krupp industries.

Included among the major facilities scheduled as reparations are: A plate and sheet shop; a rod mill; a drop forging plant for light and medium die-hammered forgings; one heavy and one nonferrous casting foundry; and one plant for pressed steel components.

Also included are facilities for manufacture of high-speed crankshafts, gear production, a spring shop, a container fabrication shop, and a screw plant and machine shop for manufacture of instruments and gun parts.

Inland Canals Link 3 Nations

Corpus Christi, Tex.—After 250 years of the use of the Mississippi River System, the Inland Canal Waterway has developed to the point where it links the three nations of North America. This long-term development came true with the opening of the Corpus Christi to Brownsville, Tex., extension of the Gulf Intra-Coastal Waterway. A deep navigation inland waterway now connects Mexico with the United States and Canada and extends to Minneapolis, St. Paul, and to Carrabelle, Fla. Under consideration by the Mexican government is an additional project which would extend the canal for many miles along that country's eastern coast.

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Steel Officials Hit "Industry" Pattern

Executives of smaller companies ask fact-finding board to see their special problems . . . Heads of bigger firms criticize the principle of fact-finding board.

New York — Officers of the smaller steel companies appearing before the steel labor fact-finding board here during the past week came up with the strongest arguments they have ever made against lumping them together with big integrated producers, labeling the package "The Steel Industry" and tagging it with the U. S. Steel wage scale. Several steel processors got in their licks too. At the same time some of the big mills' executives tore into the whole idea of replacing collective bargaining with a government-appointed board.

Rosenman Tangles With Homer

"If anyone in my company had made that [Nathan] report I'd can him," said Charles M. White, president of Republic. He added that while he was not being personal he felt that the board had no place in our peacetime economy. "Collective bargaining," he said, "is a hell of a good way to solve these problems." Mr. White cited cost figures to counter the Nathan argument that workers had not fully shared in increased productivity and that raw materials costs had come down sharply.

Bethlehem's president, Arthur B. Homer, got into a tangle with boardmember Samuel I. Rosenman when he called the board "an irregular procedure which appears to be designed merely as a vehicle for forcing upon us important concessions to the union." To this Judge Rosenman replied that he personally thought that statement ought to be withdrawn, that there ought to be an apology to the board. Mr. Homer said he intended no reflection on the board. The statement was not withdrawn.

Admiral Ben Moreell, Jones & Laughlin Steel head, declared that his company had reduced prices by an average of $2 a ton since the first of the year. He observed that he had four choices in distributing net income: Lower prices, raise dividends, boost wages or rebuild and improve plant. For the most part, said he, we have made the fourth choice to keep the company competitive.

Edward L. Ryerson, Inland Steel board chairman, charged that the break-off in negotiations with the union came from parties in no way connected with those negotiations. W. G. Caples, the company's industrial relations manager, reported that in 1947 and 1948 "Every attempt on our part to bargain . . . was met with the statement 'You will sign what the Corporation signs . . . or else.'" This, he said, in spite of the fact that Inland had offered a wage rate higher than that already agreed upon by U. S. Steel and the union.

Can't Lump Companies Together

Any increase in labor costs would "prove disastrous," W. H. Colvin, Jr., president of Crucible Steel Co. of America, told the board. The tool and specialty companies cannot be treated like the tonnage producers, he asserted, adding that even a 6.2¢ per hr wage boost would probably put Crucible in the red for 1949.

Allegheny Ludlum's president, Hiland G. Batcheller, charged that Robert Nathan's steel volume and cost theories "do not even remote-

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Gets Contract for Power System

Washington — Wunderlich Contracting Co. of Omaha has been awarded a $4,787,874 contract for construction of two tunnels to initiate construction of the Estes Park-Foothills power system, part of the Colorado-Big Thompson project. The bid was a half-million below the engineering estimate.

Construction on a companion system, scheduled to generate 75,000 kw, is expected to be completed by next summer. Completion of the Estes Park-Foothills system will add another 100,000 kw to the C-BT project by 1953.

Government Approves First Housing Under New Legislation

Washington—Getting promptly down to business, the government last week gave its official approval to $100 million worth of long range public housing projects under the recently enacted legislation.

To Galveston went the honor of the first assignment of a share in the program. The Texas city was allotted authority to build 600 low-rent, low-cost units over the next two years.

Local Authorities Get Forms

In fast succession, similar permission was granted Norfolk, Va., to construct 3000 units, and to Los Angeles, 10,000 units. Allotments were made on the basis of needs, as shown by local housing authorities, for families who cannot afford to either buy or rent adequate privately built homes.

Application forms have been distributed to 500 local housing authorities in 42 states, the Public Housing Administration says.

The total housing program authorized by the Act totals 810,000 units, but only 135,000 may be put under construction in any one year. However, the President may either increase this figure to 200,000 or reduce it to 50,000 if conditions warrant.

Although housing officials expect construction to get under way on no more than 50,000 units in the first year, they also figure on local officials getting in their bids for the full 135,000 units permitted. It is further estimated by housing officials that financial assistance contracts will have been signed for at least 100,000 units before next June.

Scrap Shipped to Canada

Buffalo—The steamer *G. G. Post* left here for Hamilton, Ont., with 5000 tons of scrap steel recently. The scrap was transferred here from nine barges that brought it through the barge canal from the eastern seaboard.

TAPER SPECIALIST: This device, developed by Timken engineers in cooperation with the Warner & Swasey Co. of Cleveland measures the taper, or angle of taper, on master tools. If the two blades shown were a mile long, with 1 sec of an arc or angle between them, they would be no more than 5/16 in. apart at the opposite end.

REA Approves 13 Loans

Washington—Rural Electrification Administration has approved an additional $11 million in loans to 13 borrowers in nine states to finance expansion of rural facilities including 832 miles of new line and improvements to existing facilities.

Largest loan was to Loup River Public Power District, Columbus, Neb., for generation and transmission facilities. This includes $3 million for completion of Loup River's 60,000-kw generator at Bellevue. Other borrowers were:

Mohave Electric Cooperative, Inc., Kingman, Ariz.; Farmers Electric Cooperative Corp., Newport, Ark.; Riceland Electric Cooperative, Inc., Stuttgart, Ark.; Alger-Delta Cooperative Electric Assn., Gladstone, Mich.; Grundy Electric Cooperative, Inc., Trenton, Mo.; Edgecombe-Martin County Electric Membership Corp., Tarboro, N. C.; Randolph Electric Membership Corp., Asheboro, N. C.; Davie Electric Membership Corp., Mocksville, N. C.; Horry Electric Cooperative, Inc., Conway, S. C.; Craig-Botetourt Electric Cooperative, New Castle, Va.; Roanoke Electric Membership Corp., Rich Square, N. C.; and Wood County Electric Cooperative, Inc., Quitman, Tex.

Tire Inventories Being Cut

Detroit—Auto tires are moving at a more rapid pace from dealer's shelves and tire inventories are being cut.

During the month of June, manufacturer's shipments of passenger car casings numbered 6,598,518 units, an increase of 11.68 pct over May shipments according to the Manufacturers Assn., Inc.

Meanwhile, inventories of 10,618,442 were 1.40 pct less than the May figure.

Truck and bus casing shipments were also up during June, totaling 936,721 units. Inventories of 2,515,374 showed little change, the association said.

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Plans Magnesium Sheet Mill

Detroit—A new plant for the production of sheet and plate magnesium is to be built in the Detroit area by the newly-formed Wrought Magnesium Corp., according to Howard Perkins, president. It is expected to be completed within a year.

Magnesium sheet will be produced in the new plant at the rate of 500,000 lb per month, Mr. Perkins said. It is anticipated that much of the new mill's output will be used in the production of aircraft, especially the larger types.

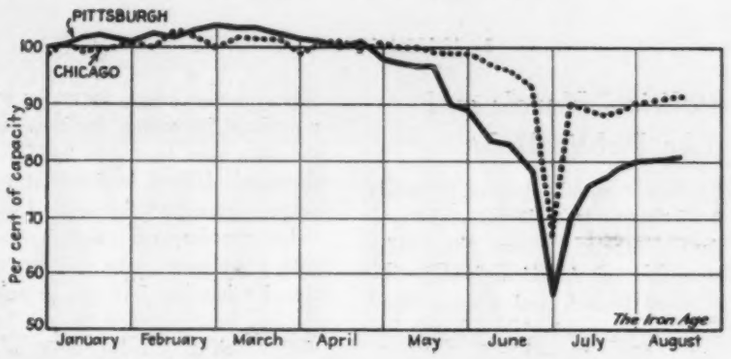
Much of the needed equipment has already been purchased, including a four-stand rolling mill. Plans for the acquisition of a 10 acre site in the Detroit area for a building of 40,000 sq ft are now under way.

Incorporated in Delaware, with an authorized capitalization of $900,000, Wrought Magnesium Corp. is a subsidiary of Brooks & Perkins, Inc., Detroit.

July Business Shows an Upturn

Chicago—The business survey committee of the Purchasing Agents' Assn. of Chicago for July reports an upturn in business conditions in all parts of their survey. Most notable improvements are in production, backlog and employment. About one third of the companies reporting reported poorer business conditions with 65 out of 100 saying it was the same as June or better.

The increase in the number of firms buying on a 60 to 90 day inventory increased sharply. However, more than half are still buying on a 30 day basis. In the Chicago area a special question concerned the method of handling vacations. In this area firms are evenly divided between shutdowns and continuous operations. However, by far the most satisfied group is the group that completely shut down the plant during the vacation period.



Chicago vs. Pittsburgh — 1949 Ingot Operating Rates

Chicago Holds Ingot Rate Above Pittsburgh

F.O.B. mill selling called main reason "Steel City" suffers . . . Chicago now outproducing Pittsburgh.

New York—While Congress wrangled over Senator O'Mahoney's freight absorption bill a graphic demonstration of the effects of enforced f.o.b. mill selling was going on in Chicago and Pittsburgh. Chicago mills been able to hold their operations at a much higher level than those in the Pittsburgh district, and with 10 pct less ingot capacity they made more steel than did the so-called "Steel City" in both June and July. It looks as though they would repeat in August.

This does not mean that Pittsburgh mills would absorb freight all the way into Chicago willy nilly once they could legally do so, and thus balance the two production rates. Profit margins on most steel products will not permit it. But ability to absorb freight will allow Pittsburgh and Ohio Valley mills to reach further toward Chicago and probably capture a lot of business that now goes to Chicago producers by virtue of a few dollars a ton freight advantage.

The accompanying chart shows how a spread appeared between Chicago and Pittsburgh ingot operations as soon as steel entered the buyers' market. This is not the first time there has been such a spread. It happened in 1937 but generally never exceeded 5 points. For the same 1937 months that are shown on the accompanying 1949 chart Pittsburgh operated at a higher percentage of rated capacity for 19 weeks while Chicago led for just four. The period in which Chicago was seriously affected by strikes is excluded from this count.

They Tied In 1937

Even late in 1937, when the ingot rate fell into the dismal twenties, Pittsburgh was tied with Chicago at 24 pct of rated capacity for 2 weeks in December, though earlier that month Chicago led Pittsburgh by 30 to 25.

It wouldn't be smart to assume that the current 10-point differential between Chicago and Pittsburgh is all due to f.o.b. selling. Today's proportionally higher freight rates must take some of the blame though increased use of barges from Pittsburgh has cut this somewhat. But it would be equally stupid to assume that f.o.b. selling has not played a big part in Pittsburgh's relative loss.

Viewing the News from

The ECONOMIC SIDE

By JOSEPH STAGG LAWRENCE

Political Morals and The Public Debt

IN recent months former Secretary of State James Byrnes, ex-President Herbert Hoover, that elder statesman of American public life Bernard Baruch and Senator Byrd have condemned the complacence with which the Administration relies upon deficit financing to bridge the gap between revenue and expenditure. The basis of this criticism is obviously nonpartisan.

Why should this easy, painless expedient for meeting "necessary" expenditures be viewed with alarm? It increases the amount of triple A securities for which insurance companies and banks eagerly bid. It keeps the "income stream at full flow," counteracts any "deflationary tendency in the economy," promotes "full employment," etc. If the public debt rises isn't it "owed to ourselves?"

These are plausible arguments. The authority of famous scholars can be invoked to support them. Nevertheless the horse sense instincts of the man in the street distrust this seductive reasoning. What's wrong with the theory that a rising public debt is innocuous, that it is an appropriate instrument for stabilizing business and assuring full employment?

In the first place when money is borrowed whether by a public or private body the necessary presumption is that it will be repaid. If there is no intention to repay then the money has not been borrowed. Refunding is merely a technical device for changing the creditors. If the intent to repay is absent then the last creditor is the sucker who fails to get his money back.

Furthermore, if the government continues to issue its IOUs without limit and these are readily convertible into currency and bank credit a growing public debt is the same as a growing supply of money. When money supply increases without limit its value declines. Thus the man who bought a bond for a thousand dollars in 1939 and accepts payment of the same amount today can buy only half as much with his money as he did 10 years ago. He has lost half his principle. He has been cheated by the inflation which a growing debt makes inevitable.

Thus a mounting public debt which the government makes no effort to halt is clear notice to every citizen with any sense that the government is bent on fraud and that the victims will be, first, the trusting buyers of its securities and, secondly, all those who have made any contracts involving future payments in dollars, the buyers of insurance policies and annuities, the thrifty who have set aside funds for old age and adversity, the workers who contribute to pension funds in the hope of getting honest dollars when they retire. These legitimate future rights to income are all undermined by a growing public debt. The issue is moral no less than economic.

The notion that the debt is owed by the government to all of us and since all of us are also liable for the debt this credit and debit in the national balance sheet cancel appeals only to the unthinking. The very purpose of taxation and the sale of specific amounts of bonds to particular buyers is to distinguish and keep separate varying claims against the government and varying degrees of liability. The "we-owe-it-to-ourselves-argument" is predicated upon equal liability to the state and an equal claim by all individuals against the state—a situation that prevails only under ideal communism.

A government that uses the public debt for any other purpose than an extreme national emergency or for investment that can justify itself on economic grounds is heading for ultimate mass fraud.

Ships Used for Grain Storage

Buffalo—Three Cleveland-Cliffs ore carriers have taken aboard storage cargoes of grain here recently because of the earlier-than-expected completion of ore contracts. They are the *Chacornac, Munising* and *Colonel,* all of which had been engaged in the Great Lakes ore trade until early August.

The early completion of ore contracts resulted from the coal mine shutdown and the subsequent 3-day work week in the mines. Unable to obtain upbound coal cargoes, vessel operators sent their ships light to the head of the Lakes, and saved much time on the upbound trips.

Several more Cleveland-Cliffs ships may be laid up here with grain storage cargoes before the end of the month, local marine circles reported. Possibility also was seen of other vessel operators contracting for storage fleet cargoes to relieve the grain elevator congestion at this port.

'49 Auto Output May Set Record

Detroit—Barring interruptions caused by strikes in auto plants, steel mills or coal mines, 1949 output of the automobile industry is heading for the 6 million mark, highest in the history of the industry.

Last week—with more than 4½ months remaining in 1949—production of passenger cars passed the 3 million mark. In addition 746,596 trucks were assembled.

The previous record is 5,378,000 cars and trucks produced in 1929.

Playboy Car Hearing Postponed

Buffalo—A Federal District Court hearing on a possible plan of reorganization for the Playboy Motor Car Corp. has been postponed until Sept. 19 at the request of Edward H. Kavinoky, attorney for trustee Allen H. Gardner. The attorney said the Reconstruction Finance Corp. might be interested in the reorganization, but that more time was necessary. The court hearing was originally scheduled for Aug. 10.

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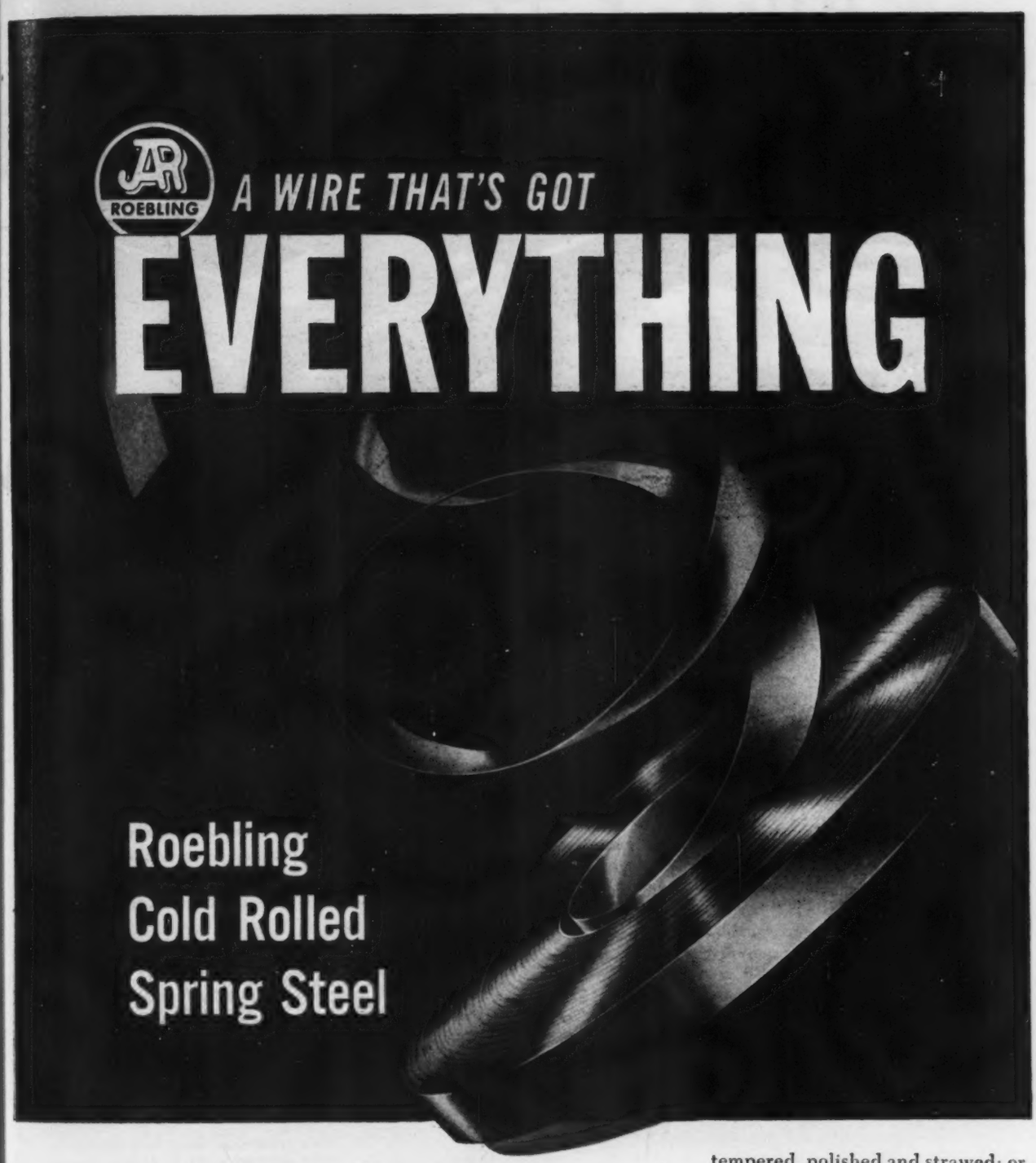

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Shipyards, stations, and the men in Uncle Sam's Navy set a standard of cleanliness that is unsurpassed. Helping to maintain this high standard of Navy cleanliness is the Dempster-Dumpster System of materials handling . . . a system of quick pick-up of preloaded containers for hauling, dumping or moving materials.

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If you have a materials handling problem demanding more cleanliness, more economy, and more efficiency, it will pay you to investigate the Dempster-Dumpster System—popularly used, not only by the armed forces, but by municipalities, leading industrial plants, and by large and small institutions of all kinds.

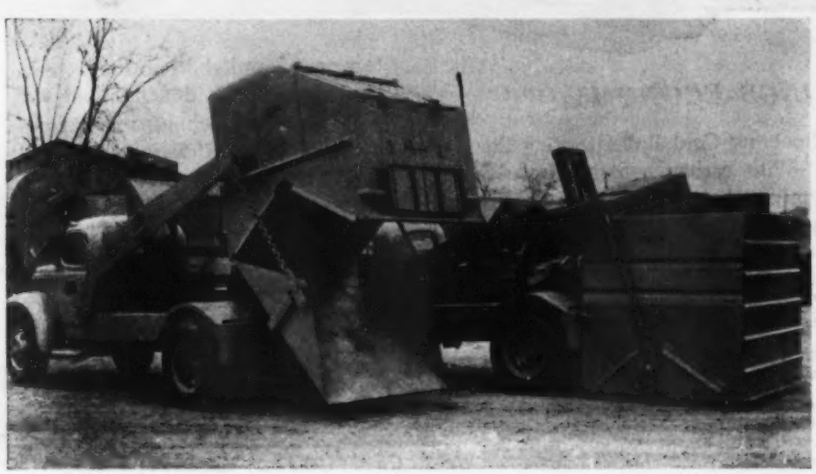

Photo above shows eleven hoisting units recently delivered to the U. S. Navy. Various types of containers are shown in carrying positions. Photo at left shows a hoisting unit preparing to lift a 10 cu. yd. Flat Top container, while another hoisting unit is dumping a 9 cu. yd. Trash and Rubbish Kolector type container. All controls of unit are conveniently located at the driver's seat. One driver and one truck handles any number of containers regardless of types.

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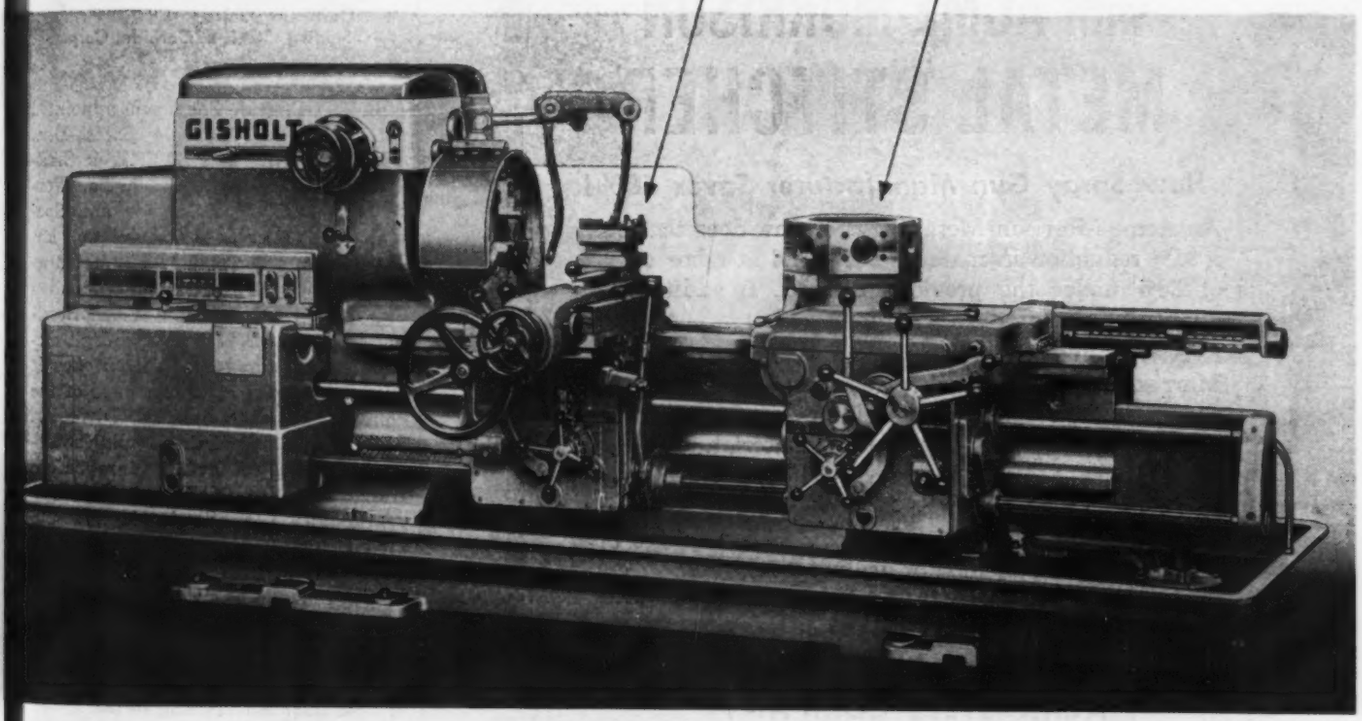
—for Rigid Standards of Accuracy!

It's one of the reasons why seasoned production men insist on Gisholt. The square turret tool post and hexagon turret are locked by double-beveled clamping rings which provide exceptional clamping pressure with easy hand motion. Moreover, on each indexing operation, turret faces are rigidly positioned by hardened and precision-ground locking pins to insure unfailing accuracy.



GISHOLT ACCURACY is further enhanced by a heavy unit-cast head stock and bed which insures real rigidity. Bedways of hardened steel (64-66 Rockwell C) are ground in perfect alignment with the spindle. And they are virtually wear-proof. If you want accuracy, insist on Gisholt.

THE GISHOLT ROUND TABLE represents the collective experience of specialists in machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • BALANCERS • SUPERFINISHERS • SPECIAL MACHINES

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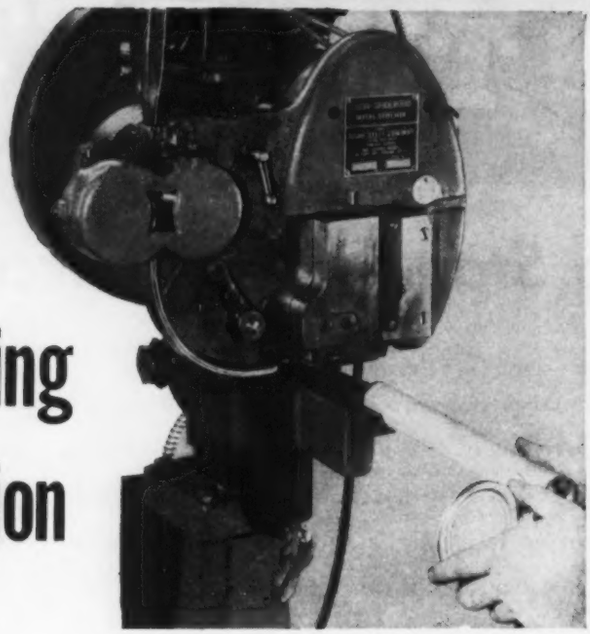
CUT Fastening Operation Costs with ACME-MORRISON METAL STITCHER



A simple machined cradle supports spray gun and allows operator to "feel" the correct position for the stitch.

How Spray Gun Manufacturer Saves 68%!

An Acme-Morrison Metal Stitcher now does the job at a 91% reduction in material costs and at labor charges of 38% under the previous method. In addition, the quality of the product was improved.

Savings like these are not unusual when an Acme-Morrison Metal Stitcher replaces other methods—rivets, screws, nails, bolts, or spot welding—in fastening sheet metal to metal or any non-metallic material.

In a single operation, this machine forms its own stitch (or staple) from a coil of wire, drives it through the metal and clinches—all accomplished in 1/5 of a second. No pre-punching or drilling is required.

See if you can't put this time-saving, money-saving method in your assembly line. Mail the coupon today.

CROSS-SECTION VIEWS OF STITCHES

STITCHING WIRE DIVISION

ACME STEEL COMPANY

NEW YORK 17 ATLANTA CHICAGO 8 LOS ANGELES 11

ACME STEEL COMPANY, Dept. IA-89
2840 Archer Avenue, Chicago 8, Illinois

☐ Send free booklet, "*Metal Stitching.*"
☐ Have representative call.

Name _____

Company _____

Address _____

City _____ Zone _____ State _____

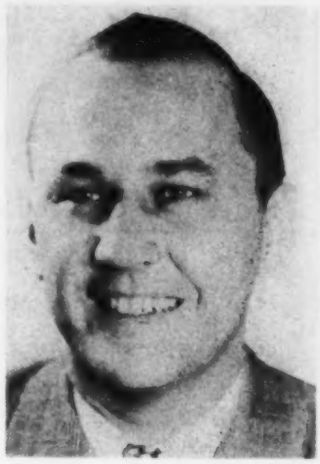
Aluminum, leather and copper stitched together

Aluminum, plywood and brass stitched together

Textile stitched to aluminum

Iron Age Introduces

Continued from Page 21

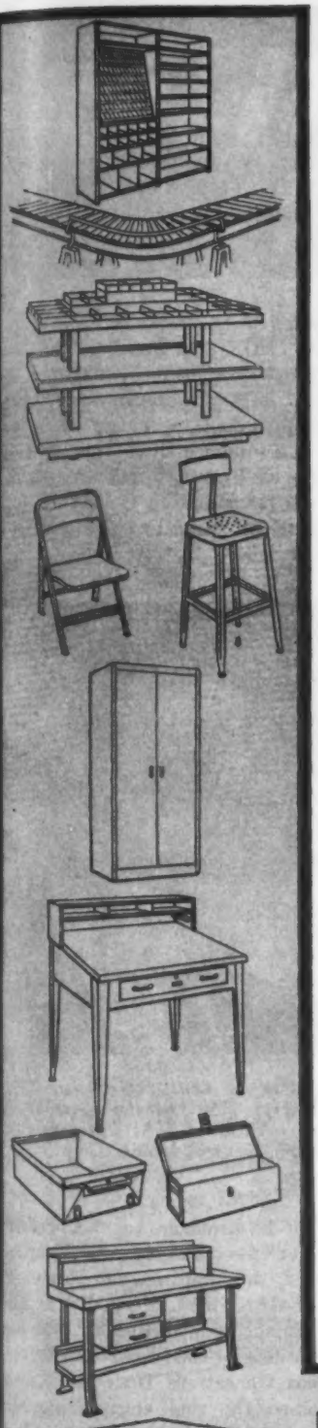


C. R. HARMON, sales manager, Carbide Sales Div., Firth Sterling Steel & Carbide Corp.

C. R. Harmon has been appointed sales manager, Carbide Sales Div., FIRTH STERLING STEEL & CARBIDE CORP., McKeesport, Pa. Formerly manager of Carbide and Specialty Sales for Jessop Steel Co., Mr. Harmon later organized and acted as sales manager for Penn Carbide Alloy Casting Co. He entered Firth Sterling in March 1947 as Pittsburgh district sales manager. **J. M. Stokes** is named assistant sales manager of the company's Carbide Sales Div. Mr. Stokes was at Firth Sterling's Detroit sales office for 18 years before transferring to McKeesport, Pa., 3 years ago. **J. J. Sowko** is now the Pittsburgh branch sales manager. He served as manager of carbide sales of the Chicago District for 10 years, before his recent promotion.

Edward Hurlburt is now manager of Consumer Advertising in the Power Tool Division of ROCKWELL MANUFACTURING CO., Pittsburgh. **Walter E. Schutz** has become their manager of Industrial Advertising. Both will make their headquarters in Milwaukee.

W. J. Howell is now assistant manager of apparatus sales for the WESTINGHOUSE ELECTRIC CORP., Pittsburgh. In 1941 he acted as assistant to the district manager, Pacific Coast.



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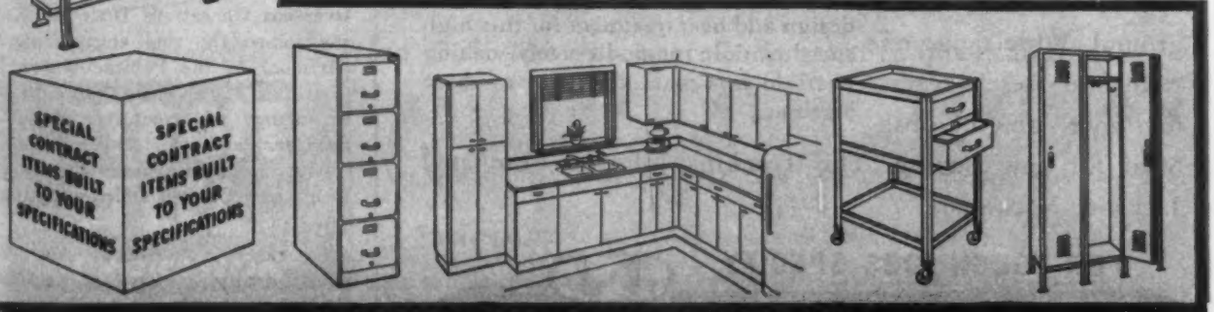
LYON METAL PRODUCTS, INCORPORATED

General Offices: 836 Monroe Avenue, Aurora, Illinois • Branches and Dealers in All Principal Cities



A PARTIAL LIST OF LYON PRODUCTS

- Shelving
- Lockers
- Wood Working Benches
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- Kitchen Cabinets
- Display Equipment
- Hanging Cabinets
- Welding Benches
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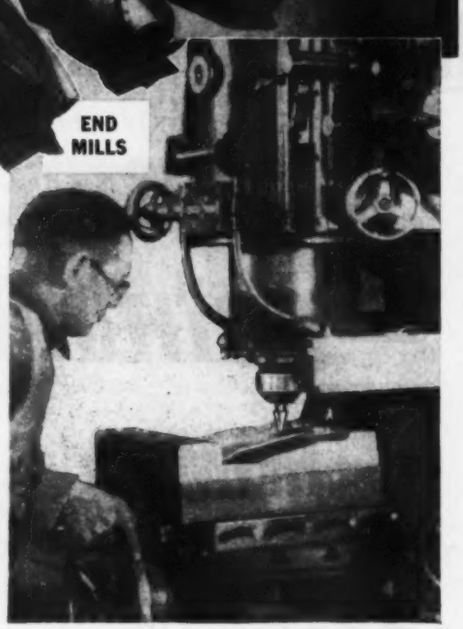
- Cabinet Benches
- Folding Chairs
- Drawing Tables
- Storage Cabinets
- Bench Drawers
- Work Benches
- Drawer Units
- Conveyors
- Shop Boxes
- Bar Racks
- Bin Units
- Tool Stands
- Service Carts
- Hopper Bins
- Parts Cases
- Flat Drawer Files
- Tool Trays
- Desks
- Stools
- Tool Boxes
- Sorting Files
- Ironing Tables

T-J Die Sinking Milling Cutters "have what it takes" for cutting tough die steels with *speed* and *accuracy!* They're *extra sturdy* . . . hold a sharp edge longer . . . less breakage! Made from a standard, extremely high grade steel . . . properly machined . . . scientifically heat-treated and accurately ground. Wide range of styles and sizes . . . ready for your tough jobs! Send for new catalog. The Tomkins-Johnson Company, Jackson, Michigan.



This T-J Cutter at work on a connecting-rod die block for a board drop hammer. Material being milled is "Hardtem" die steel. A cutter of right design and heat treatment for this high speed work in tough die steels, making possible maximum efficiency of these machines.

FOR TOUGH JOBS SPECIFY T-J

TOMKINS-JOHNSON

DIE SINKING MILLING CUTTERS

IRON AGE INTRODUCES

Continued

Lyman A. Wine has been appointed assistant to the president of the ELECTRIC AUTO-LITE CO., Toledo. Mr. Wine joined Auto-Lite in 1942 and has been sales manager of the Lamp Div. at Cincinnati.

Thomas M. Chalmers has joined the BLAW-KNOX CO., Pittsburgh, as engineering consultant on steel mill equipment. Mr. Chalmers was formerly vice-president in charge of operations of Tennessee Coal, Iron & Railroad Co. at Birmingham. He will devote special attention to rolling mill machinery produced by the company's Lewis division.

SEMON E. KNUDSEN, director, Process Development Section of Facilities & Processes Staff, General Motors Corp.

Semon E. Knudsen has become director of the Process Development Section of the Facilities and Processes Staff of GENERAL MOTORS at Detroit. He succeeds **Harold T. Johnson**, who has been transferred to the GM Overseas Operations Div. Mr. Knudsen joined the tool engineering department of the Pontiac Motor Div. of GM in 1939. While there he held a number of executive production positions, and was assistant general master mechanic prior to the transfer to his new Central Office assignment.

Lawrence C. Whitsit has been named quality engineer of Kelvinator Div., NASH-KELVINATOR CORP., Detroit. Mr. Whitsit joined the inspection staff 16 years ago. He was chief inspector of the company's propeller division at Lansing during World War II.

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PAYS OFF ACCORDING TO YOUR NEED

DEPENDABLE DAN
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Whether your problem is delivery... inventory control or cost... RELIANCE can save you time and money.

SHEET STEEL

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Reliance Job-Fitting Methods Apply to Seconds as Well as Primes

For Immediate Action Call The Nearest Reliance Plant or Office:

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JACKSON 18, MICH., 801 Reynolds Bldg., JAckson 3-3258
NEW YORK 19, N. Y., 230 West 57th St., COlumbus 5-4879
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Your own design formed and threaded parts produced *Extra Fast* with *Extra Economy*

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2917 EAST 79TH STREET • CLEVELAND 4, OHIO

CLEVELAND *Top Quality* **FASTENERS**

ORIGINATORS OF THE KAUFMAN DOUBLE EXTRUSION PROCESS

Specialists for more than 30 years in
CAP SCREWS, SET SCREWS, MILLED STUDS
Ask your jobber for Cleveland Fasteners

IRON AGE INTRODUCES

Continued

William C. Burton has been appointed chief draftsman in the land department of the TENNESSEE COAL, IRON & RAILROAD CO., Birmingham, succeeding Benjamin M. Harrison, who has been retired.

Carl M. Foreman has been appointed manager of the Dayton Sales District of PORTSMOUTH STEEL CORP., Portsmouth, Ohio. Mr. Foreman was previously sales representative at Dayton for Republic Steel Corp.

GERALD F. HINES, district sales manager, Follansbee Steel Corp.

Gerald F. Hines has been appointed district sales manager for the Philadelphia area of FOLLANSBEE STEEL CORP., Pittsburgh. The new representative has been active in the steel business for almost 20 years.

Ray T. Melville, sales representative of the HANNA FURNACE CORP., Buffalo, has become district sales manager for that city. **Carl A. Harmon**, chief metallurgist, has been appointed sales manager of pig iron specialties. From Buffalo Mr. Harmon will direct sales of high silicon iron and similar products in all districts for the company.

W. M. Frame is now works manager in charge of all engineering and manufacturing operations at KEROTEST MANUFACTURING CO., Pittsburgh. He formerly served as works manager, Spang Chalfont Division of National Supply Co.

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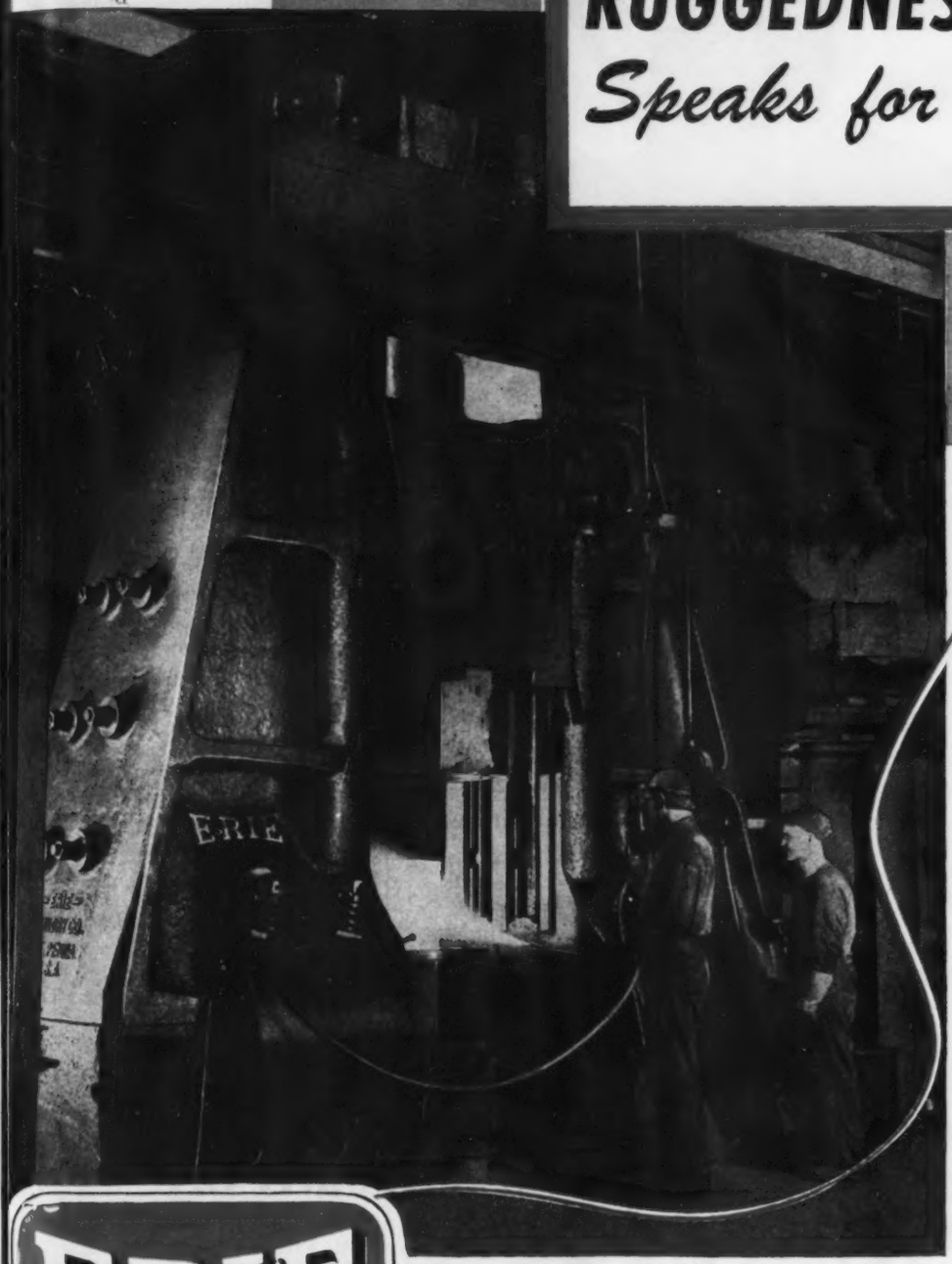
ERIE HAMMERS *are Built with* RUGGEDNESS *that Speaks for Itself*



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For full details write for Bulletin 340

ERIE FOUNDRY COMPANY · *Erie, Pa., U. S. A.*

ERIE BUILDS *Dependable* **HAMMERS**

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Is YOUR FIRM getting its first taste of battery-powered handling by using one or more motorized hand trucks? Chances are that you're trying out your equipment on all sorts of jobs . . . and realizing in how many ways battery-industrial trucks can speed handling and increase production.

If so, now is the time to become acquainted with long-life EDISON Nickel-Iron-Alkaline Storage Batteries . . . the batteries that give you real dollar economy. Did you know they're electrically foolproof — require no critical adjustment of charge rates — can't be injured by reverse charging, short circuiting or similar electrical accidents? Did you know they're built of rugged steel inside and out to withstand rough usage? Did you know EDISON Service Engineers check your batteries regularly and help you to maintain them in top condition?

EDISON Batteries last and last, and so through the years their superiority costs you less and less. Prove this to yourself by asking the EDISON users in your own vicinity, then profit by their experience.

ADVANTAGES OF EDISON NICKEL-IRON-ALKALINE BATTERIES: They're mechanically durable; electrically foolproof; quickly and easily charged; simple to maintain; not injured by standing idle.

EDISON
Nickel • Iron • Alkaline
STORAGE BATTERIES

EDISON STORAGE BATTERY DIVISION
of Thomas A. Edison, Incorporated, West Orange, N. J.
In Canada: International Equipment Co., Ltd., Montreal and Toronto

IRON AGE INTRODUCES

Continued

Harry T. Graham has risen to the position of assistant general sales manager of GENERAL REFRACTORIES CO., Philadelphia. He has been with the company since 1937, in the Chicago and Philadelphia offices. In 1947 he became assistant district sales manager of the Pittsburgh office.

Fred H. Pillsbury has been appointed vice-president in charge of operations of the CENTURY ELECTRIC CO., St. Louis. At the time of his promotion, Mr. Pillsbury had been serving as executive engineer.

George Matthews has joined the MIDLAND STEEL PRODUCTS CO., Detroit, as engineer in charge of frame design. Mr. Matthews had previously been associated with Dodge, Hupp and Studebaker. **W. A. McKinley** has been appointed vice-president of engineering.

K. W. Rhoads has been appointed to handle the sales activities in metropolitan New York and New England for the DETROIT ELECTRIC FURNACE DIV., KUHLMAN ELECTRIC CO., Bay City, Mich., Mr. Rhoads is located in the eastern division sales office of the Kuhlman Co. in New York.

James R. Hewitt, Jr. is the new Texas and Southwestern Representative of the COLUMBIA TOOL STEEL CO., Chicago Heights, Illinois. Mr. Hewitt's office is located in Houston, Texas.

L. B. Dobbins has been appointed supervisor of plant engineering, AIR REDUCTION SALES CO., New York. Mr. Dobbins, formerly superintendent of the Johnstown tonnage oxygen plant, will be succeeded in that position by **J. C. White**, former superintendent of the Gloucester, N. J., oxygen plant.

OBITUARY

John A. Williams, 53, associated with Frederic Flader, Inc., died Aug. 13.

Fred Finkl, 73, executive vice-president, A. Finkl & Sons Co., died July 23.

Osborne F. Ricker, 63, office supervisor, Boston Pipe & Fitting Co., Inc., died Aug 3.

Resume Your Reading on Page 22

When These 6,377 Fasteners Pay Off!

Dark sky . . . wind . . . devastating rain mean there's no time to lose. So you give 'er everything she's got and pray you'll get in most of the crop before it's too late. That's when the holding power of the 6,377 fasteners in this combine really pay off.

1867 bolts . . . 415 cap, set and tapping screws . . . 1840 rivets . . . 2255 nuts form the steel network that locks the framing members of this combine together.

Because these fasteners are called upon to hold their own on a rugged day-in and day-out schedule, top quality is essential. That's why Russell, Burdsall and Ward with 104 years' experience still carries on intensive research and development work to improve fastener holding power further.

It is unsound economy to use inferior fasteners, since the price of fasteners is such a small part of the total product cost. It isn't the initial price but the cost of *using* fasteners that counts.

To attain *T*rue *F*astener *E*conomy, you can save assembly time, reduce plant inspection, and get the maximum holding power per dollar of fastener cost with a dependable quality fastener. *T*rue *F*astener *E*conomy contributes to the kind of production savings that put more and more combines on U. S. wheatfields every year. It is this type of contribution to major American industries that explains why—for over 104 years—RB&W has been *making strong the things that make America strong.*

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

Plants at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Cal. Additional sales offices at: Philadelphia, Detroit, Chicago, Chattanooga, Oakland, Portland, Seattle. Distributors from coast to coast.

RB&W

6,377 Fasteners are used in 1 American Combine

104 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

(Did you know that Kester makes over 100,000 sizes and types of flux-core solder?)

For over fifty years Kester has been concerned with producing solder for every phase of industrial work. Take advantage of this experience by consulting Kester's Technical Department on all soldering problems. There is no obligation.

FREE—Technical Solder Manual Available on Request

Send for Kester's new solder manual, "SOLDER and Soldering Technique."

KESTER SOLDER COMPANY
4201 Wrightwood Avenue • Chicago 39, Illinois

Factories also at
Newark, New Jersey • Brantford, Canada

1899 50th Anniversary 1949

KESTER SOLDER

FREE

PUBLICATIONS

Continued from Page 32

nonferrous melting pots and molds, and its applications in other fields is now being investigated. *Jackson Iron & Steel Co. For more information, check No.* 10 *on the postcard on p.* 33.

Industrial Ovens

Industrial ovens for drying, baking and heat treating operations are featured in 4-p. bulletin. Ovens operating at temperatures up to 1100°F include cabinet, kiln and various conveyer type ovens. *Michigan Oven Co. For more information, check No.* 11 *on the postcard on p.* 33.

Telescopic Conveyers

Portable, telescopic conveyers, of the roller and skate types, are described in bulletin. These conveyers, weighing 80 lb, can be extended from 54 in. to 124 in. and can carry up to 75 lb per sq ft. *Maguire Machinery Co., Inc. For more information, check No.* 12 *on the postcard on p.* 33.

Refractory Materials

Bulletin describes refractories for suspended arches and sectionally supported walls and their applications to various types of furnaces, incinerators and dehydrators, refinery heaters, and boilers. *Laclede-Christy Clay Products Co. For more information, check No.* 13 *on the postcard on p.* 33.

Pipe Plugs

Precision made steel pipe plugs are described in bulletin No. 104. Plugs are available in either standard pipe or dry seal threads and can be furnished to special order in alloy steels, aluminum or brass in sizes up to 2⅝ in. diam. *J. J. Tourek Mfg. Co. For more information, check No.* 14 *on the postcard on p.* 33.

Resume Your Reading on Page 33

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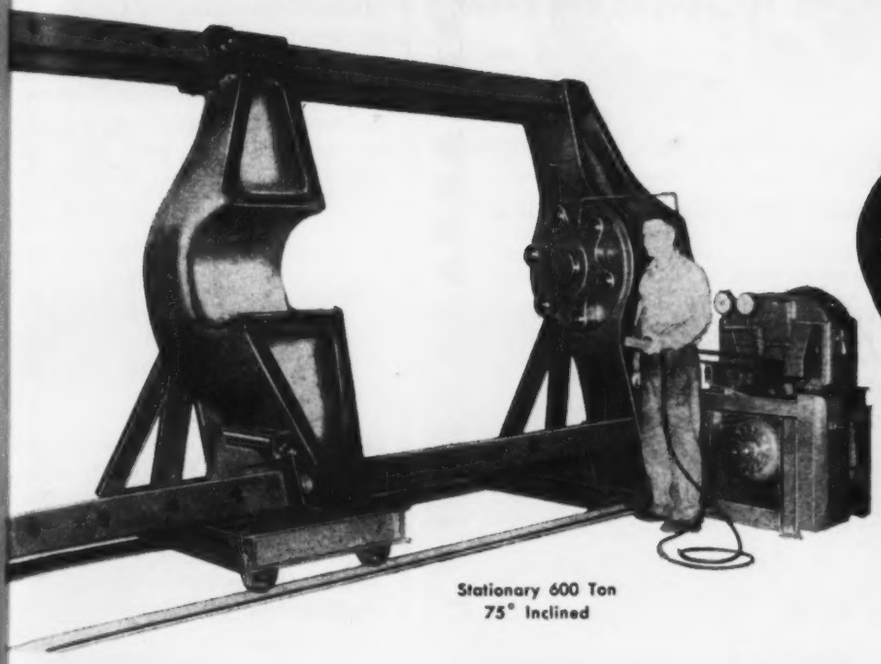
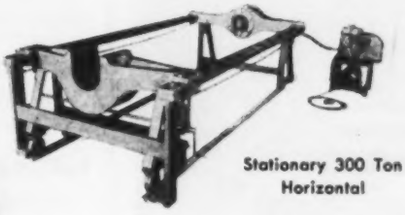
FORCE *for the* HEAVY JOBS



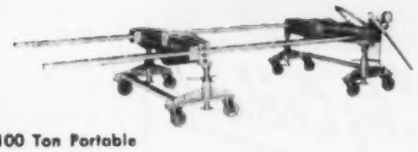
Stationary 600 Ton
75° Inclined

Rodgers Forcing Presses

Open Yoke Vertical
150 Ton



Stationary 300 Ton
Horizontal



100 Ton Portable

Choose from this versatile selection of Rodgers Forcing Presses to meet your requirements for pressing, bending, straightening, forming and other operations. Units can be had either portable or stationary; horizontal, vertical or inclined; 100 to 600 tons! They can be powered with either hand operated or power-driven hydraulic pumps.

For rugged, heavy duty work there are three big 600 ton units—75° inclined, 90° inclined and horizontal. Remote controls are included with the power-driven pumps so that operator may work from any desirable location.

Other stationary forcing presses are available in 200, 300 and 400 ton capacities in horizontal, 75° or 90° inclined. Portable units for versatile plant use are available in 100 and 200 ton capacities, with either hand or power-driven pumps. The open yoke vertical press, as shown, is a specially designed unit to meet your applications.

SEND FOR NEW CATALOG

Full information on Rodgers Forcing Presses is given in New Catalog No. 315. Send for your copy today.

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HYDRAULIC POWER EQUIPMENT

Make our plant your gear department—

Heavy pitch gears for construction equipment.

You can very frequently obtain quality gears and gear assemblies at a saving over present cost.

Our facilities include the most modern gear cutting machines of all types and many specialized machines arranged in batteries for volume precision production.

Expert engineering service is available to our customers for planning production on an efficient and economical basis. Write for a copy of Amgears Case Histories that illustrate the value of our engineering service.

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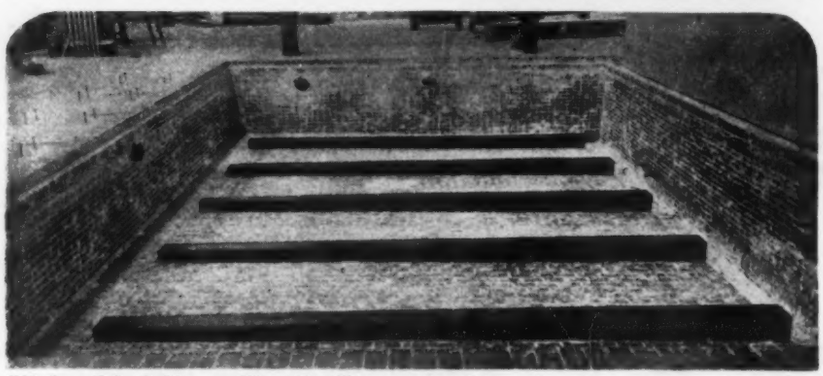

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Our quarter century of experience is your guarantee of performance. When you plan construction of new pickling tanks, neutralizing tanks, floors, process tanks or fume ducts write for recommendations concerning your specific operating conditions. Representatives in most principal cities.

Ceilcote Products include acid and alkali proof— • Linings • Membranes • Bonding Cements • Brick • Protective coatings

★ FROM DESIGN TO INSTALLATION OF CORROSION-PROOF EQUIPMENT YOU CAN RELY ON

CEILCOTE

CEILCOTE *Corrosion Proof*
MATERIALS • CONSTRUCTION • SUPERVISION

The CEILCOTE *Company* ROCKEFELLER BUILDING • CLEVELAND 13, OHIO

NEW PRODUCTION IDEAS

Continued from p. 36

with a traveling plough. Automatic lifting of the plow when it reaches the head end of the conveyer allows the feed to pass over the head pulley. The plow can be pushed or moved by hand crank to the hopper,

giving discharge at any point from one end of the bin to the other. The belt is flattened at the plow for complete discharge. The machine was designed for filling a series of long narrow bins where there is very little headroom. The unit illustrated has an 18 in. x 29 ft long belt troughed by two-pulley, dust-sealed ball bearing troughing rollers. *Trowbridge Conveyor Co. For more information, check No. 27 on the postcard on p. 33.*

Lifting Truck

A truck for medium-high lifting, with a 12 to 36 in. top-of-platform range can engage an object directly, or a load on skids, the height of which is above that of the ordi-

nary low-lift truck. It facilitates handling through low doorways, passageways and in elevators. The base of the platform moves vertically in a relatively short column mounted on the forward part of the truck body; power-lift transmission is simple and positive. The

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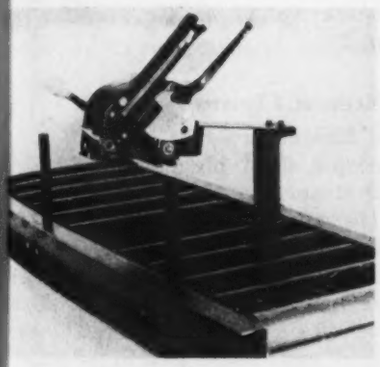
driver has a clear view of loads and areaways, for fast maneuvering. Capacity ranges from 4000 to 10,000 lb. Loads can be raised or lowered from minimum to maximum level in less than 1 min. Travel speed is 4¼ to 6 mph. It is equipped for all-electric or gas-electric drive. *Elwell-Parker Electric Co. For more information, check No. 28 on the postcard on p. 33.*

Strapping Unit

Packaging conveyers can be adapted to fast, efficient strapping methods by inserting a new strapping unit into the production line. Different models suit varied needs. Each unit consists basically of a roller section to which is fastened



a rigid mount and quick-change bracket for the strapping tool. Installation may be in the main conveyer line or at right angle to it. A steel trough in the middle of the unit holds a loop of steel strap in such a way that a package can be moved quickly through the circle and strapped. *Acme Steel Co. For more information, check No. 29 on the postcard on p. 33.*

Pressure Regulator Valves

A new pressure regulator valve compensates for variations in liquid fuel or water consumption by holding the outlet pressure within narrow limits. It reduces pressures of as high as 100 psi to any constant lower pressure, and operates under conditions of variable inlet pressure by throttling the passage of flow. Valves are rust and corrosion proof, for use with aromatic compounded fuels, water, etc. It is suitable for extreme temperatures. Simplified construction

NEW! FANSTEEL TEMPERED SOLDERING TIPS

better soldering at a saving!

The *new* Fansteel-developed copper base alloys used in Fansteel TEMPERED Soldering Tips overcome old production difficulties encountered in intermittent and continuous soldering work. Now...tips have longer life, require less redressing, maintenance, improve soldering quality *and increase output per operator.*

Cat. No. 6801 Fansteel Alloy No. 1 —For tips of large mass, for operations with low melting point solders and where mechanical wear is not a serious problem.

Cat. No. 6802 Fansteel Alloy No. 2 —For heavy duty continuous service, especially where precisely formed tips of small section are required.

Both alloys are obtainable in cold drawn round rods or in standard or special soldering tips.

Ask for Technical Data Bulletins and price sheets with details, data and diagrams of Fansteel TEMPERED Soldering Tips, and Alloys. Many soldering requirements will be met adequately with Cat. No. 6801 or 6802 available from stock. Special tips ready for use are made to customer's specifications. Fansteel Metallurgical Corporation, North Chicago, Illinois.

PURE METALS
Tantalum, Tungsten, Molybdenum, and Columbium in sheet, rod, wire, special shapes and parts.

POWDER METALLURGY PRODUCTS
Finished or semi-finished shapes and parts of special analysis to achieve high strength, density, electrical conductivity, resistance to wear, impact, heat erosion, or combinations of these and other properties.

COPPER BASE ALLOYS
Copper alloyed with other elements, to combine high conductivity with strength, elasticity, resistance to heat, impact, or wear. Available in bars, rod, sheet, strip, castings, forgings, finished or semi-finished parts, for current-carrying springs and other parts, soldering tips, resistance welding electrodes, dies and fixtures.

11606-B

PRODUCTS & SERVICES INCLUDE:
ELECTRICAL CONTACTS
SELENIUM RECTIFIERS
METALS: TANTALUM, TUNGSTEN
MOLYBDENUM, COLUMBIUM
COPPER BASE ALLOYS
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Ready for action to save lives — that is the job this Stearns Magnetic clutch has at a large Southern coal mine. Installed between the stand-by engine and the fan, the clutch insures continuous ventilation in case of power line failure. Picking up the load before the fan has stopped turning, the Stearns Magnetic clutch is the vital link that saves lives by uninterrupted ventilation.

Be sure to investigate Stearns Magnetic clutches and clutch-brake combinations before you buy. Compact simplified design, powerful magnetic action, low initial and maintenance cost make Stearns Magnetic friction units your best bet for transmission and machinery control.

Write today for bulletins giving complete specifications and operating data.

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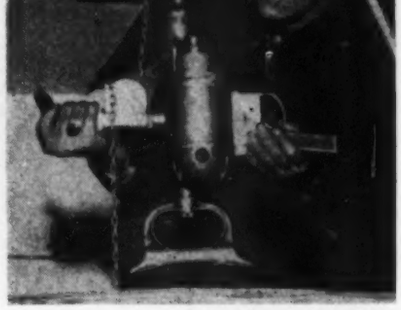
NEW PRODUCTION IDEAS

Continued

employs only one moving part. Parts can be replaced without removing valve from system. *Lear Inc., Romec Div. For more information, check No.* 30 *on the postcard on p.* 33.

Pressure Handle

By attaching a pressure handle to standard portable electric or pneumatic drills, an operator can



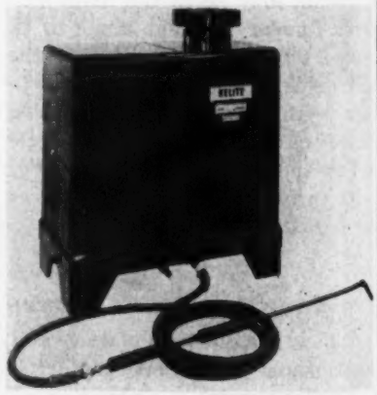
control the drilling pressure of the tool by simply turning the handle. One end of a feed chain is fastened to the work, the other placed over the chain sprocket on the handle. By twisting the handle, the force is transmitted by a worm gear to the sprocket which rotates and creates a pulling force on the chain. *Pressure Handle Co. For more information, check No.* 31 *on the postcard on p.* 33.

Boiler Scale Analysis

The spectrograph is now being used in the solution of water problems, speeding boiler scale analysis by identifying constituents of a deposit quickly. Thus, in many cases boiler tube failure causes may be ferreted out quickly. The sample is burned in a dc arc, where the heat breaks down practically all compounds into their elements. These are sorted out by the spectrograph, identifying the elements even when present in a mixture of many substances. Chemical analysis is more accurate, but the spectrographic method permits quick identification of traces of minute metallic constituents. *Hall Laboratories, Inc. For more information, check No.* 32 *on the postcard on p.* 33.

Steam Cleaner

Measuring 44 in. wide x 24 in. deep x 45 in. high, the new Model Q steam cleaner has an output of 110 gal of solution vaporized per hr. An automatic pump, all-steel welded construction, automatic fuel regulator and safety shut-off, high velocity nozzle, and aerated gun grips are incorporated in the model. Stationary and portable models are available. They require no special



skill to operate. *Kelite Products, Inc. For more information, check No.* 33 *on the postcard on p.* 33.

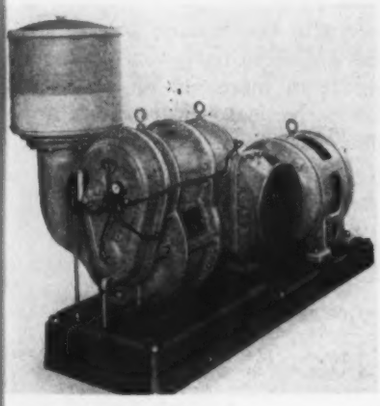
Linear Ball Bearing

A new ball bushing having a substantially greater load rating and suitable for use where shaft rigidity and load capacity are important is designed primarily to give anti-

friction support to linear motions along 1½-in. diam guide rods or reciprocating shafts. This bushing affords low friction and a close fit to the guide rod without binding and chatter. Precision alignment is maintained over long periods since the free rolling ball bearing action eliminates wear. Length of stroke is unlimited. The OD of the bearing is 2.375 in. and the overall length is 3.00 in. *Thomson Industries, Inc. For more information, check No.* 34 *on the postcard on p.* 33.

Blower

Quiet operation, reduced weight, and compactness are features of a new positive displacement blower. The blower has wide applications in industry and is available in capacities from 100 to 15,000 cfm and for pressures up to 20 lb. A 2000 cfm Standardaire blower



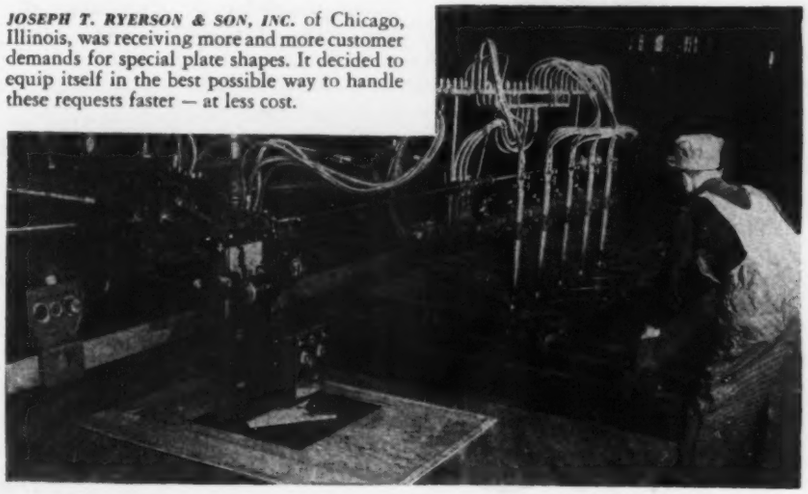
weighs approx 1000 lb. Because it may be operated at high speeds, the blower lends itself to direct drive by standard motors. *Standard Stoker Co., Inc. For more information, check No.* 35 *on the postcard on p.* 33.

Stacking Box

Designed for handling and storing medium loads, a stacking box of 16 and 18-in. gage steel is available in sizes 10x16x6 in. to 10x20x8 in. A continuous rim assures maximum rigidity when boxes are stacked. Other features include reinforced corners, spotwelded construction, four rivets for extra strength, and drop handles at each end. *Bay, Inc. For more information, check No.* 36 *on the postcard on p.* 33.

Resume Your Reading on Page 37

steel warehouse meets growing demand for special order plate shapes with electronic eye guided machine gas cutting



JOSEPH T. RYERSON & SON, INC. of Chicago, Illinois, was receiving more and more customer demands for special plate shapes. It decided to equip itself in the best possible way to handle these requests faster — at less cost.

A. H. Yoch and J. F. Franzen, Airco Technical Representatives, were called in, and recommended machine gas cutting with Airco's new No. 41 Travograph, equipped with Airco's famous "electronic eye" tracing device. Ryerson has since put eleven of these new machines to work in its various warehouses throughout the country.

After installation, Ryerson soon confirmed that this equipment produced more intricate shapes on a production basis than any other type of cutting equipment — the "eye" following a sketch with a high degree of accuracy. Further, expensive template making was eliminated entirely.

Today, the variety of steel shapes flame cut by Ryerson is almost endless — for example, a few of the parts and pieces include: circles, rings, wrenches, flanges, weldment parts, crankshafts, clamps, housings, cams, machine parts, and die parts . . . highly profitable business for the "little iron store" that grew into one of the world's largest steel warehousing firms.

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To assure its customers of high efficiency in all applications of the oxyacetylene flame or electric arc, Air Reduction makes available the broad, practical experience of its nationwide Technical Sales Division personnel. The collective experience and knowledge of these specialists has helped thousands to a more effective use of Airco processes and products. Ask about this Airco "Plus-Value" service today. Write your nearest Airco office. (In Texas: Magnolia Airco Gas Products Company . . . On West Coast: Air Reduction Pacific Company)

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Also available in pellet and liquid form

It's this simple: Select the Tempilstik° for the working temperature you want. Mark your workpiece with it. When the Tempilstik° mark melts, the specified temperature has been reached.

$2 each

gives up to 2000 readings

Available in these temperatures (°F)			
125	275	500	1100
138	288	550	1150
150	300	600	1200
163	313	650	1250
175	325	700	1300
188	338	750	1350
200	350	800	1400
213	363	850	1450
225	375	900	1500
238	388	950	1550
250	400	1000	1600
263	450	1050	

FREE —Tempil° "Basic Guide to Ferrous Metallurgy" — 16¼" by 21" plastic-laminated wall chart in color. Send for sample pellets, stating temperature of interest to you.

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Harvester Employees Buy Company's Common Stock

Chicago—The employees of International Harvester Co. have subscribed to approximately 666,000 shares of the company's common stock under an employee stock subscription plan which started in May. A total of 12,351 employees are participating which represents 17.4 pct of the total employees as subscribers and the average subscription amounts to 54.4 shares each.

A total of 1.2 million shares was made available to employees at the price of $20.00 a share, the stock to be paid for by payroll deductions over a 4-year period. The plan was offered by the company in response to many employee requests for a stock purchase plan.

Focke Will Head A.S.M.

Cleveland—Arthur E. Focke, research metallurgist for the Diamond Chain Co., Indianapolis, will be the next president of American Society for Metals, according to W. H. Eisenman, ASM executive secretary. Walter E. Jominy, staff engineer, Chrysler Corp., will be the next vice-president.

BRAZING TEMPERATURES

Continued from page 70

operations. This effect is least pronounced in manganese bronze and brass. In the case of hardenable ferrous materials, heat treatment can be combined with brazing to obtain the desired properties.

When the ferrous materials involved in the brazing process possess enhanced hardenability resulting from increased alloy content, the mechanical properties are little affected or are improved by the brazing treatment.

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TABLE III

Effects of Brazing Temperatures on Ferrous Metals

No.	Type of Steel	Form and Condition	Tensile Strength, Psi	Yield Strength, Psi	Elongation, Pct	Hardness Bhn
16	SAE 1010	Cold Finished Bar:				
		As Received, Specified	60,000	45,000	8.0	120
		Actual	94,000	90,000	14.4	206
		As Brazed at 1400° F	70,000	50,500	30.9	135
		As Brazed at 2057° F	66,800	44,500	28.3	130
		Brazed at 2057° F; Normalized at 1742° F	70,700	45,000	28.6	133
17	SAE 1045	Hot Rolled Bar:				
		As Received, Specified	80,000	45,000	20.0	160
		As Brazed at 2057° F	96,400	52,030	16.7	206
		Brazed at 2057° F; Normalized at 1652° F	93,800	62,000	27.8	190
18	SAE 1095	Cold Finished Annealed Bar:				
		As Received, Specified	88,000	50,000	15.0	178
		As Brazed at 2057° F	138,000	81,800	4.0	305
		Brazed at 2057° F; Normalized at 1562° F	124,500	66,000	8.7	237
19	SAE 4140 (Cr-Mo)	Hot Rolled, Annealed Bar:				
		Quenched and Tempered, 1229° F	110,000	90,000	16.0	250
		As Brazed at 2057° F	135,000	93,000	15.5	280
		Brazed at 2057° F; Normalized at 1652° F	130,000	88,000	16.5	260
20	SAE 3135 (Ni-Cr)	Forged and Annealed Bar:				
		Quenched and Tempered at 1184° F	105,000	85,000	20.0	256
		As Brazed at 2057° F	117,000	79,000	14.1	255
		Brazed at 2057° F; Normalized at 1697° F	118,000	84,900	14.7	243
21	SAE 6150 (Cr-V)	Hot Rolled, Annealed Bar:				
		Quenched and Tempered 1103° F	130,000	105,000	13.0	320
		As Brazed at 2057° F	136,900	92,500	12.4	297
		Brazed at 2057° F; Normalized at 1625° F	128,350	90,500	20.2	260
22	416 Stainless: Hardenable	Cold Finished Bar:				
		As Received	80,000	35,000	18.0	220
		As Brazed at 2012° F	138,700	120,000	15.0	260
		Brazed at 2012° F; Hardened at 1850° F; and Tempered at 662° F	220,000	170,000	4.5	495
23	303 Stainless: Austenitic	Annealed Bar:				
		As Received, Specified	85,000	35,000	35.0	230max
		Actual	90,000	47,000	50.6	160
		As Brazed at 1400° F	91,000	41,500	50.4	150
		As Brazed at 2012° F	93,000	36,000	61.0	135

Briefs and Bulletins

castings prices—Mild revival in foundry business is partly a reflection of the overall metalworking pickup. But an added factor is the general shakeout in castings prices. One big midwestern castings buyer reports that iron and steel castings prices are off an average of 5 pct since the first quarter. Volume is still low, but foundries are calling a few workers back, buying a little scrap again, accepting more pig iron and working off the coke stocks they built up in fear of a coal strike.

quick shift—This week steel is tighter in Detroit than anyone had expected it to be. The earlier thinking had been that August would be a lean month, especially if a steel-labor settlement occurred. With a showdown postponed, orders have been piling up rapidly. Three major mills have reported October a sellout on sheets. Auto company purchasing agents are setting as many as three men on local representatives to push in all possible deliveries before Sept. 15.

cooperation—Warehouses have been cooperating with one another to reduce excessive inventories of stainless steel products. Before placing a mill order, the warehouse checks others in the district to draw on overloaded inventories. Net return is usually split equally between the two. Warehouses have about reached the bottom of the stainless barrel and some good mill business can be expected from them.

dominion cutback—One of the blast furnaces of Dominion Steel & Coal Corp., Ltd., at Sydney, N. S., is being blown out. The reasons are: (1) The company has a sufficient stock of iron on hand and (2) business from sterling countries is slow.

silvery iron—Keokuk Electro-Metals Co.'s quotation for electric furnace silvery pig iron of $77.00 per gross ton f.o.b. Keokuk, Iowa or Wenatchee, Wash., includes "freight allowed to normal trade areas."

steel report—The "Annual Statistical Report" of the American Iron and Steel Institute for 1948 is now being distributed to institute members. Chief revision over the 1947 report is more information on alloy steel products.

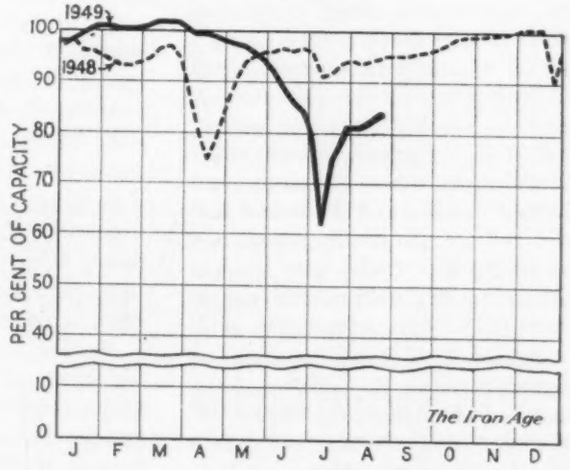
stronger demand — Demand for warehouse carbon and stainless steels, copper and aluminum have been improving in the East. At the same time mill deliveries of steel and copper products are being extended. Distress steel products are being sold at lower prices but this has had no apparent effect on warehouse sales.

ford plant—It is expected that Ford's new pressed metal plant at Buffalo will double the company's stamping capacity. It is slated to produce about 42 pct of Ford's stampings. Construction is expected to begin soon. A contract for structural steel has already been awarded to Bethlehem Steel Co.

nice goin'—The 4 millionth vehicle produced during 1949 came off the assembly line last week, according to estimates prepared by *Automotive News*. The auto tempo is expected to be increased by production boosts at Buick, Studebaker and Packard.

more alloy capacity — Last week Timken Roller Bearing Co., Canton, Ohio, put another openhearth back into operation. This put Timken's alloy steel production back up to 70 pct of capacity.

Steel Operations



District Operating Rates—Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
August 14	81.5*	90.0*	75.0	83.0	97.5*	103.0	97.0	97.0	87.0*	83.5	79.0	87.0	53.5*	83.5
August 21	82.0	91.5	78.0	84.0	94.0	101.0	98.5	101.0	94.0	87.5	79.0	87.0	63.5	85.0

* Revised.

Steel Officials Testify

Continued from Page 93

ly resemble the facts." Except for carbon steel scrap, the prices of practically every one of A-L's raw materials remain at record high levels, he noted. "Our own breakeven point is close to 60 pct of capacity, rather than the 30 to 35 pct referred to by the union," Mr. Batcheller asserted.

A. M. Treadwell took the stand for Sharon Steel, where he is assistant to the president and personnel director. Sharon's June and July operations were at a greatly reduced rate, he pointed out, and the union demands would, if granted, produce substantial losses.

Carl W. Meyers, president of Colorado Fuel & Iron Corp., declared that CF & I negotiations with the union had not broken down but that he wanted to help develop the facts to facilitate continued collective bargaining.

Consider Small Producers

Urging a special Presidential board to inquire into the position of the small non-integrated steel producers, Mark Follansbee told the fact-finders that Follansbee Steel would survive only as long as its capital and surplus lasted if it acceded to the union's current demands. That, he added, would be a comparatively short time, since the company lost money in May and June and had not run its steelmaking facilities since April. "Right now we are operating our cold-rolling equipment only 3 days a week," he said.

Robert W. Wolcott, president of Lukens; Ralph K. Clifford, president of Continental; James W. Kinnear, Jr., president of Firth Sterling Steel & Carbide; and A. L. Haglund, executive vice-president of Northwestern Steel & Wire, were among officials of smaller steel firms who argued that an industry wage pattern would be unfair and in some cases disastrous to their companies. Small steel companies in the Pittsburgh district which deal with the USWA have to pay as much as the big companies, said Mr. Kinnear, "even if they go broke in the process."

Carl I. Collins said that the union had last month rejected an insurance offer by Superior Steel, of which he is president. That offer would have virtually doubled benefits of an existing social security program without direct additional cost to employees.

Cites Recent Losses

J. K. Beeson, executive vice-president of Pittsburgh Steel, noted that the company had lost money in June and July and said that it must spend $10 millions out of earnings or borrowings to modernize equipment in the next 5 years. He also estimated that it would have to absorb $500,000 a year in freight in the future to maintain production and employment.

M. W. Saxman, Jr., president of Latrobe Electric Steel, predicted that tool and specialty steel manufacturers would gradually be taken over by the big companies if the board ignored the special problems of the small company.

The value of all property will be washed out if the inflationary spiral is not stopped while the economy is declining, Frank Purnell, Youngstown Sheet & Tube president, warned the board.

R. Conrad Cooper, industrial engineering vice-president of U. S. Steel, denied the Nathan contention that man-hour productivity rose 50 pct in the past 10 years. U. S. Steel's did not, he said, adding that what gains there were came from increased demand, new equipment and managerial skill. Enders M. Voorhees, chairman of the finance committee, U. S. Steel Corp., pointed out that John L. Lewis's pension success—based on "uncontrolled monopoly power"—has given other union bosses an "insatiable appetite" in their competitive race for superiority—an appetite which cannot be satisfied.

Construction Steel Awards

Fabricated steel awards this week included the following:

860 Tons, Chicago, building for the Herald-American Publishing Co., to Hansell-Elcock Co., Chicago.

1900 Tons, Seaside-Island Heights, N. J., additional tonnage, bridge, through Ole Hansen, Pleasantville, N. J., to Bethlehem Steel Co., Bethlehem.

750 Tons, Bronx, N. Y., Dollar Savings Bank, to Grand Iron Works, New York.

205 Tons, Cook County, Ill., Hospital Dormitory, to Johnson Iron Works, Chicago.

140 Tons, Clay County, Iowa, State Highway Bridge, to Graves Bros. Co.

Fabricated steel inquiries this week included the following:

2500 Tons, Chicago, Veterans Hospital, bids due Sept. 6.

1215 Tons, Boise, Idaho, channel structures and steel tunnel, Lucky Peak Dam, Walla Walla District, Corps of Engineers, Walla Walla, Ser. CIVENG-45-164-50-20, bids to Oct. 5.

765 Tons, Arrowsic and Woolwich, Me., steel superstructure of the Arrowsic Bridge over the Sasanoa River, bids due Aug. 31.

650 Tons, Queens County, N. Y., Public School 178, due Sept. 6.

585 Tons, Piedra, Calif., Pine Flat Dam on Kings River, Sacramento District, Corps of Engineers, Sacramento, Ser. CIVENG-04-167-50-5, bids to Nov. 1.

180 Tons, Vernon Twp., Pa., bridge over Cussewago Creek, Pennsylvania Dept. of Highways, bids to Sept. 9.

130 Tons, Mt. Pleasant, Pa., bridge near McSherrystown Borough, Pennsylvania Dept. of Highways, bids to Sept. 9.

120 Tons, Indio, Calif., bridge across Smoky Gulch near Indio, California Div. of Highways, Los Angeles, bids to Sept. 15.

Reinforcing bar inquiries this week included the following:

1025 Tons, Piedra, Calif., Pine Flat Dam on Kings River, Sacramento District, Corps of Engineers, Sacramento, Ser. CIVENG-04-167-50-5, bids to Nov. 1.

215 Tons, Bethel Township, Pa., divided highway, Pennsylvania Dept. of Highways, bids to Sept. 9.

Steel piling awards this week included the following:

250 Tons, Washington County, Iowa, Honey Creek Park project through E. M. Dusenberg and A. R. Coffeen, to Carnegie-Illinois Steel Corp., Pittsburgh.

185 Tons, Chicago, Lloyola Park jetty through Harry A. Thompson Co., to Carnegie-Illinois Steel Corp., Pittsburgh.

Bearing pile awards this week included the following:

122 Tons, Chicago, Seventh Ave. bridge through M. J. McDermott Co., to Carnegie-Illinois Steel Corp., Pittsburgh.

110 Tons, Chicago, 167th St. grade separation to Arcol-Midwest Corp., Chicago.

Railroad car awards this week included the following:

The Louisville & Nashville R.R. has placed an order for 100 70-ton covered standard steel hoppers with Pullman-Standard Car Mfg. Co. the cars to be built at Pullman's Bessemer, Ala. plant. Delivery has been promised during the late months of the current year.

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Lake Ore Shipping Season May End in October This Year

Movement to mid-August was above '48 due to coal decline.

Cleveland—Sour weather of a sort threatens to bring 1949 iron ore movement, which on Aug. 15 was nearly 3 million tons ahead of the 1948 peacetime record on the same date, to a close some time in October. Declining ore consumption and lack of dock and furnace yard storage space are forcing shippers to lay up boats.

Consumption of Lake Superior district iron ore by U. S. and Canadian blast furnaces dropped to 5,258,321 gross tons in July from 6,248,535 gross tons in June, according to the monthly report of the Lake Superior Iron Ore Assn. Consumption for the year to date totaled 48,423,087 gross tons Aug. 1, compared to 44,820,566 gross tons in the corresponding period of 1948, the report showed.

Stocks of iron ore on hand at furnaces and Lake Erie docks Aug. 1 totaled 35,063,647 gross tons, compared to 27,696,146 gross tons July 1 and 32,610,785 gross tons on Aug. 1, 1948.

Coal Off by 4.5 Million Tons

Chief factor in the accelerated movement of ore is less up-lake coal movement, which last week totaled 23,817,780 gross tons, compared with 28,271,023 tons for the same period of 1948, according to Ore & Coal Exchange figures. Boats have been going up light, reducing turn-around time.

Delivery Dates Stretch Out

Chicago—Galvanized sheets are the tightest flat-rolled product in the steel industry today. The larger mills are booked well into the fourth quarter and could be filled solidly if they accepted all orders. Mills charging above-market prices still have some open space but at best they are quoting late October delivery.

Hot-rolled sheet and strip are practically booked through October on Chicago mills. Cold-rolled sheets are solid through October, with one big producer here reporting a full order book through November. Plate schedules are almost filled for October here and late October or early November delivery is being offered.

Barium Steel Corp. Contracts To Buy Phoenix Iron Co.

Phoenixville, Pa.—Barium Steel Corp. has contracted to buy the Phoenix Iron Co. and Phoenix Bridge Co., located here, for a purchase price of $2 million for the iron producer and an undisclosed price for the bridge plant.

A substantial deposit has already been made. The balance is due on Sept. 19. Plant inventories include 12,500 tons of basic pig iron, worth, at present prices, $600,000, and 3500 tons of standard structural shapes, worth $231,000 at the present base price.

It is understood that Phoenix Iron Co. will be operated in conjunction with Central Iron and Steel Co., Harrisburg, Pa., which is also owned by the Barium interests. Some Phoenix ingots will be shipped to Harrisburg. Several of the operating men of the Barium interests are now stationed at the Phoenixville plant in order to work out operating procedures.

Represented Kaiser-Frazer

Sale of the two plants was handled for Kaiser-Fraser Co. by H. H. Buncher Co., Pittsburgh, who acted as exclusive sales agents for the seller, as well as the operating management for the bridge company and the closed-down iron plant. Representatives of the Buncher Co. will continue to act in this capacity until Sept. 19.

Facilities of the Phoenix Iron Co. include five basic openhearths with an ingot capacity of 231,400 tons. There are two structural mills with a shape capacity of 259,000 tons, and a blooming mill.

Ecuador Invites Bids for Aluminum Roofing and Nails

Washington—U. S. firms have been invited by the Minister of Finance of Ecuador to submit quotations on 2000 tons of aluminum corrugated roofing sheets and 75 tons of wire nails to repair earthquake damage.

Specifications of the commodities are as follows: 2000 tons corrugated roofing sheets, aluminum, of thickness either .019 or .024 in., in lengths of 6, 8, 10, or 12 feet, packed either in 500-lb or 2000-lb bundles, eight or ten 3-inch corrugations per sheet; and 75 tons of wire nails, common, assorted sizes.

Prices should be submitted on an f.a.s. basis directly to the Ministro De Hacienda, Quito, Ecuador.

Export houses may secure further information from the Metals and Minerals Branch of OIT.

Join Hands on Wrong Date

New York—Ever get your dates crossed? That's what happened in THE IRON AGE in the issue of Aug. 18, 1949, p. 59.

This was a full page color ad headed "4 Leaders Join Hands." The four leaders, of course, were the societies sponsoring the 31st Annual Metal Congress & Exposition in Cleveland. It was a novel idea, and it looked good. But anyone planning to come on the dates mentioned would be late.

You guessed it, the dates were wrong. The metal show this year will be Oct. 17-21. Will you fix your calendar?

Soss Boosts Output 20 Pct

Detroit — Soss Manufacturing Co. has stepped up its production 20 pct through the addition of a second 8-hour shift to daily operations. Charles J. Soss, president, said a boost in output of automobile hinges was necessary to keep pace with increased production by some of the company's automotive customers.

Nonferrous METALS OUTLOOK

Market Activities

by John Anthony

August shipments of copper to show marked upturn . . . Copper scrap market strong . . . Sales of lead high . . . Aluminum ingots sold at higher prices.

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New York—Sales for August deliveries of copper to consumers were close to 67,000 tons by the middle of the month and industry members were freely predicting that August might show 70,000 to 75,000 tons, a healthy improvement for a summer month over July's less than 50,000 tons. But with August production estimated at 75,000 to 80,000 tons, the industry expects that there may be a small increase in inventories reported at the end of July to be nearly 213,000 tons. Sales for September shipment had reached 21,000 tons by mid-August. This tonnage may not include sales to fabricating subsidiaries which are generally placed after the first of the month.

Copper Scrap Strong

The copper scrap market has been strengthening during the last month, the latest indications being the reported payment of 14½¢ for No. 1. Dealers and smelters report that copper scrap is very scarce. The plant of one smelter at Carteret, N. J., has been on strike for some time. If this plant were in operation there would be a scramble for scrap. There is no progress in strike negotiations. Union and management are meeting every week, but the plant engineering study is still the cause of disagreement. Decision on wages and benefits awaits the steel case findings.

NONFERROUS METALS PRICES

	Aug. 17	Aug. 18	Aug. 19	Aug. 20	Aug. 22	Aug. 23
Copper, electro, Conn.	17.625	17.625	17.625	17.625	71.625	17.625
Copper, Lake, Conn.	17.75	17.75	17.75	17.75	17.75	17.75
Tin, Grade A, New York	$1.03	$1.03	$1.03	$1.03	$1.03	$1.03
Zinc, East St. Louis	10.00	10.00	10.00	10.00	10.00	10.00
Lead, St. Louis	14.80–14.975	14.925–14.975	14.925–14.975	14.925–14.975	14.925–14.975	14.925–14.975

Note: Quotations are going prices.

The price spread in primary lead at New York was wiped out last week when St. Joseph Lead Co. raised its price at St. Louis by ⅛¢ to 14.925¢. There is still a spread of 0.05¢ at St. Louis.

August shipments of lead will be the highest of any month this year or last. It is expected that July shipments of 67,000 tons will be exceeded by about 15,000 tons in August. This figure may be compared with the monthly average of 57,000 tons last year. Average shipments of lead during the first 7 months this year are higher than the same period last year. This is rather startling considering the decline in the lead market in the early part of the year. With this background, it is not surprising that there has been some evidence of easing off in demand recently. Sales of lead last week were considerably smaller than in previous weeks. July battery replacement units were up substantially, and there was bound to be a reversal of the trend.

Lead scrap had not been moving freely in the last month or so and smelters had been reducing the smelting charge. This brought out heavy tonnages to meet the requirements for antimonial lead. Last week there was an about face and smelters began raising the smelting charge, the latest reported being in the range of $60 to $65 a ton. Antimonial lead is not generally usable and there has been no important freeing up of other grades of lead scrap.

Aluminum Ingots Higher

Deoxidizing grades of secondary ingot were being bought at an increase of ¼¢ per lb. In view of the closing down of the Carteret refinery the available business is being spread around operating members of the industry. It is learned that there are strike shutdowns also in ingot producing plants at Cleveland, Chicago and Buffalo.

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	38.50
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$52.00
Bismuth, ton lots	$2.00
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$1.80 to $1.87
Copper, electro, Conn. Valley	17.625
Copper, lake, Conn. Valley	17.75
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$100 to $110
Lead, St. Louis	14.925-14.975
Lead, New York	15.125
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask f.o.b. New York	$75 to $78
Nickel, electro, f.o.b. New York	42.93
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$69 to $72
Silver, New York, cents per oz.	71.50
Tin, Grade A, New York	$1.03
Zinc, East St. Louis	10.00
Zinc, New York	10.70
Zirconium copper, 10-12 pct Zr, per lb contained Zr	$12.00

Remelted Metals

Brass Ingot

(Published prices, cents per lb delivered, carloads)

85-5-5-5 ingot		
No. 115	14.50*	16.00
No. 120	14.00*	15.50
No. 123	13.50*	15.00
80-10-10 ingot		
No. 305	....	20.50
No. 315	....	17.50
88-10-2 ingot		
No. 210	....	27.00
No. 215	....	24.00
No. 245	17.00*	19.25
Yellow ingot		
No. 405	12.25*	13.75
Manganese bronze		
No. 421	....	18.50

*F.o.b. Philadelphia.

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	18.75-19.00
0.60 copper, max.	18.50-18.75
Piston alloys (No. 122 type)	16.75
No. 12 alum. (No. 2 grade)	15.50-16.00
108 alloy	16.00-16.25
195 alloy	17.00-17.25
13 alloy	18.50-18.75
AXS-679	16.50
5% Ti, Aluminum, f.o.b., Eddystone, Pa.	
Low copper	31.00
2% copper	28.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	16.75-17.25
Grade 2—92-95%	15.75-16.25
Grade 3—90-92%	14.75-15.25
Grade 4—85-90%	13.75-14.25

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	34%
Electrodeposited	28¾
Rolled, oval, straight, delivered	31.46
Ball anodes	32¾
Brass, 80-20	
Cast, oval, 15 in. or longer	30¾
Zinc, oval, 99.886, f.o.b. Detroit	17¼
Ball anodes	16¼
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	60.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	45.00
Copper sulfate, 99.5 crystals, bbl.	11.10
Nickel salts, single or double, 4-100 lb bags, frt allowed	18.00
Nickel chloride, 300 lb bbl.	24.50
Silver cyanide, 100 oz lots, per oz.	59
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc sulfate, crystals, 22.5 pct, bags	6.75
Zinc sulfate, 25 pct, flakes, bbl.	7.75

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 33.6¢ to 64¢; 11 to 13, 34.6¢ to 76¢; 23 to 25, 36.7¢ to $1.05; 35 to 37, 44¢ to $1.53; 47 to 49, 63.5¢ to $2.20.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3.5 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Drawn, ⅛ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ⅜ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ⅝ to 2 in., R317-T4, 37.5¢ to 34.5¢; rolled, 1 9/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2⅛ to 3⅝ in., R317-T4, 33.5¢ to 32.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheets and Plate: Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Extruded Round Rod: M, diam in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2¼ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¾ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangle: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb per ft, per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.3 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ¾, 76¢; 1 to 2 in., 65¢; 0.065 to 0.083, ¾ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢; 0.165 to 0.219, ⅝ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Base prices, cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold rolled	60	47
Strip, cold-rolled	66	50
Rods and bars	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks	..	40

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Sheets	Rods	Extruded Shapes
Copper	31.30	....	30.90
Copper, hot-rolled	....	27.15	....
Copper, drawn	....	28.40	....
Low brass	29.47	29.16	32.38*
Yellow brass	28.19	27.88	31.20*
Red brass	29.89	29.58	32.80*
Naval brass	33.13	27.19	28.44
Leaded brass	....	22.76	26.85
Commercial bronze	30.84	30.53	33.50*
Manganese bronze	36.63	30.54	32.04
Phosphor bronze	50.47	50.72	....
Muntz metal	31.15	26.71	27.96
Everdur, Herculoy, Olympic, etc	36.19	35.14	....
Nickel silver, 10 pct	39.12	41.41	41.44
Architectural bronze	....	....	26.85

*Seamless tubing.

Scrap Metals

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	14⅝	13⅞
Yellow brass	12	11
Red brass	13¼	12½
Commercial bronze	13½	12¾
Manganese bronze	11⅝	10⅞
Leaded brass rod ends	11¾	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	14.25
No. 2 copper wire	13.25
Light copper	12.25
Refinery brass	12.00*
Radiators	9.00

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	14.25
No. 2 copper wire	13.25
Light copper	12.25
No. 1 composition	10.75 to 11.00
No. 1 comp. turnings	10.25 to 10.50
Rolled brass	9.00
Brass pipe	9.50
Radiators	9.00
Heavy yellow brass	8.25 to 8.50
Aluminum	
Mixed old cast	9.00
Mixed old clips	9.25
Mixed turnings, dry	8.00
Pots and pans	9.00
Low copper	11.50

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	12½—12¾
No. 2 heavy copper and wire	11½—11¾
Light copper	10½—10¾
Auto radiators (unsweated)	7½— 7¾
No. 1 composition	8¾— 9
No. 1 composition turnings	8¼— 8½
Clean red car boxes	7½— 7¾
Cocks and faucets	7½— 7¾
Mixed heavy yellow brass	6¼— 6½
Old rolled brass	7½— 7¾
Brass pipe	8¼—8½
New soft brass clippings	10 —10½
Brass rod ends	7¾— 8
No. 1 brass rod turnings	7½— 7¾

Aluminum

Alum. pistons and struts	4¼— 4½
Aluminum crankcases	6½— 7
2S aluminum clippings	10½—11
Old sheet and utensils	6½— 7
Borings and turnings	3½
Misc. cast aluminum	6½— 7
Dural clips (24S)	6½— 7

Zinc

New zinc clippings	5½— 6
Old zinc	3½— 4
Zinc routings	2½— 3
Old die cast scrap	2½

Nickel and Monel

Pure nickel clippings	16 —17
Clean nickel turnings	14 —15
Nickel anodes	16 —17
Nickel rod ends	16 —17
New Monel clippings	10½—11½
Clean Monel turnings	6 — 7
Old sheet Monel	8 — 9
Old Monel castings	7 — 8
Inconel clippings	10 —11
Nickel silver clippings, mixed	6 — 7
Nickel silver turnings, mixed	5½— 6

Lead

Soft scrap, lead	11½—11¾
Battery plates (dry)	6½— 6¾

Magnesium

Segregated solids	9 —10
Castings	5½— 6½

Miscellaneous

Block tin	70 —72
No. 1 pewter	47 —49
No. 1 auto babbitt	40 —42
Mixed common babbitt	11½—12
Solder joints	10½—11
Siphon tops	45 —47
Small foundry type	12¾—13¼
Monotype	12 —12½
Lino. and stereotype	11½—12
Electrotype	10½—11
New type shell cuttings	10¼—10⅝
Hand picked type shells	4
Lino. and stereo. dross	5½— 5¾
Electro. dross	4¼— 4½

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UNIT 1020A . . . Perfectly balanced . . . All-around stability . . . Handles a 45 inch magnet with ease.

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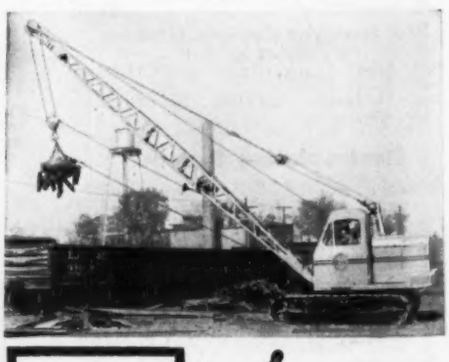
Quickly convertible to hook, clamshell or magnet, the UNIT 1020A can handle every scrap yard job.

The UNIT 1020A handles heavy steel, baled or loose scrap with day-in and day-out dependability.



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MARKETS—PRICES—TRENDS

SCRAP
Iron & Steel

Advance Slows Down With Prices Firm

Scrap prices continued their advance this week but the market seems to have lost some of its punch. Foundry grades are strong and in some instances demand exceeds the supply. Heavy mill buying has not yet developed despite the increase in prices. The top quotation on No. 1 steel moved up $3.00 in Detroit; in Philadelphia and Birmingham it was $2.00 higher; and in Pittsburgh and New York it was 50¢ higher. THE IRON AGE scrap composite is up another 75¢ per gross ton this week to $21.92.

PITTSBURGH—On the basis of broker buying to cover old orders, No. 1 heavy melting steel is up 50c. this week to a top of $23.50. In the absence of mill buying, the Pittsburgh market continued quiet but firm. Machine shop turnings were up $1.00 to $16.00 on the basis of a sale, and shoveling turnings rose 50¢ to a top of $18.00. Heavy turnings also rose 50¢, to $19.50.

CHICAGO—Things cooled off a little in the week for the first time since the market strengthened. The trade seems to be waiting for a substantial mill purchase to confirm a stronger market before they go further in piling up yard inventories. Right now dealers are refusing to sell at the few offers being made at present. It appears the mills are going slow in buying and are waiting to see what happens in labor early in September. Railroad scrap edged a bit higher last week; but here again the advances have slowed down to a walk.

PHILADELPHIA—Mill buying of heavy melting grades sent the district market up by $1.50 to $2.00 last week. There was still no buying of blast furnace or low phos grades but the stronger sentiment in the market was reflected by higher prices. The prospective sale of Phoenix Iron Co. means that this consumer may soon become a district customer again. Consumers are still buying cautiously, and dealers are reported to be not overanxious to market scrap heavily at current prices. It has been estimated that more than 150,000 tons of scrap remains in yard inventories in this market.

NEW YORK—There is definitely a better feeling concerning the strength of the market after higher quotations for the past month. Foundries have been doing considerable buying to be assured of enough scrap for the new orders which are coming in. Mill buying is still small. Dealers are reluctant to part with scrap at the quoted prices. Material is still slow coming into the yards. No. 1 heavy melting is up another 50¢ this week to $14.50 to $15.00.

DETROIT—The temperature of the market continues to rise, despite absence of big mill buying. Whether local buying is to cover shortages or for speculation is undecided but there is ample evidence that the local market is strong across the board. This week prices have been boosted $3.00 per ton for most major grades, following a $2.00 pickup last week. Even so, unconfirmed reports of limited buying at still higher prices continue to be heard.

CLEVELAND—At least one major Valley consumer bought a representative tonnage of No. 1 late last week for $25.00, a move which should do much to end the fiction that the backbone of the present market is broker talk. Indications are that the market will go higher, as the problem of covering orders becomes more acute. Foundries are buying and there is plenty of strength in the foundry grades where demand temporarily exceeds supply.

BOSTON—A slightly better sentiment continues but activity is still far below normal. Prices haven't shown any change. An encouraging sign has been provided by cast. There are no price changes, but dealers are accumulating cast and making a few more sales than they have.

BUFFALO—Dealers blew hot and the mills blew cold this week, enveloping the scrap market in a fog that made any price changes impossible to determine. Consumers and sellers apparently were still $2.00 to $3.00 apart on openhearth grades. A leading consumer indicated there was not likely to be any major buying until the threat of a steel strike is out of the way—and probably not before October in any event. A substantial tonnage of No. 1 heavy melting steel was reportedly being held for $25.00 in this area. A big foundry bought about 1000 tons of No. 1 cupola cast at $30.00 delivered, which was believed to have cleaned up the floating supply of that grade.

CINCINNATI—Despite sympathetic strength from other districts, openhearth grades were unchanged at press time in the absence of local mill support. Foundries are buying limited tonnages and displaying some inclination to pay the higher prices, but much of the buying is on a hand-to-mouth basis. The trade is waiting for mills to come in and dealers are holding tonnage for higher prices which will probably move to other districts where prices warrant.

BIRMINGHAM—For the second consecutive week No. 1 heavy melting steel has advanced $2.00 in this market and the undertone is stronger throughout the list. No. 1 cupola cast has brought as much as $35.00, a $1.00 advance. Despite the increase in prices, scrap receipts at dealers' yards have yet to show any increase in volume.

ST. LOUIS—Steel mills are expected to come into the market sometime this week at prices higher than their previous purchases. In the meantime brokers are paying $1.00 a ton more than present quotations for No. 1 and No. 2 heavy melting steel and No. 2 bundled sheets. Receipts continue light and brokers say that they must reach out some distance to get material. The Missouri Pacific is out with its largest list in some time, a total of 69 cars, including 30 cars of No. 1 melting steel and 10 cars of rerolling rails.

Scrap IRON AND STEEL Prices

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$23.00 to $23.50
No. 2 hvy. melting	21.00 to 21.50
No. 1 bundles	23.00 to 23.50
No. 2 bundles	19.00 to 19.50
Machine shop turn.	15.00 to 16.00
Mixed bor. and ms. turn.	15.00 to 16.00
Shoveling turnings	17.50 to 18.00
Cast iron borings	17.00 to 17.50
Low phos. plate	23.50 to 24.00
Heavy turnings	19.00 to 19.50
No. 1 RR. hvy. melting	23.50 to 24.00
Scrap rails, random lgth.	26.50 to 27.00
Rails 2 ft and under	31.00 to 32.00
RR. steel wheels	26.00 to 27.00
RR. spring steel	26.00 to 27.00
RR. couplers and knuckles	26.00 to 27.00
No. 1 machinery cast.	34.00 to 35.00
Mixed yard cast.	30.00 to 31.00
Heavy breakable cast.	24.00 to 25.00
Malleable	29.00 to 30.00

Chicago

No. 1 hvy melting	$22.00 to $23.00
No. 2 hvy. melting	20.00 to 21.00
No. 1 factory bundles	22.00 to 23.00
No. 1 dealers' bundles	21.00 to 22.00
No. 2 dealers' bundles	19.00 to 20.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	14.00 to 15.00
Low phos. forge crops	26.00 to 26.50
Low phos. plate	24.50 to 25.50
No. 1 RR. hvy melting	27.00 to 28.00
Scrap rails, random lgth.	32.00 to 33.00
Rerolling rails	37.00 to 38.00
Rails 2 ft and under	37.00 to 38.00
Locomotive tires, cut	37.00 to 38.00
Cut bolsters & side frames	30.00 to 31.00
Angles and splice bars	32.00 to 33.00
RR. steel car axles	36.00 to 37.00
No. 3 steel wheels	30.00 to 31.00
RR. couples and knuckles	30.00 to 31.00
No. 1 machinery cast.	40.00 to 41.00
No. 1 agricul. cast.	38.00 to 39.00
Heavy breakable cast.	33.00 to 34.00
RR. grate bars	28.00 to 29.00
Cast iron brake shoes	28.00 to 29.00
Cast iron car wheels	34.00 to 35.00
Malleable	33.00 to 34.00

Philadelphia

No. 1 hvy. melting	$19.50 to $20.50
No. 2 hvy. melting	18.00 to 19.00
No. 1 bundles	19.50 to 20.50
No. 2 bundles	17.00 to 18.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	16.00 to 17.00
Low phos. punchings, plate	23.00 to 24.00
Low phos. 5 ft and under	23.00 to 24.00
Low phos. bundles	19.50 to 20.50
Hvy. axle forge turn.	19.50 to 20.50
Clean cast chem. borings	19.00 to 20.00
RR steel wheels	23.00 to 24.00
RR spring steel	23.00 to 24.00
No. 1 machinery cast.	30.00 to 31.00
Mixed yard cast	27.00 to 28.00
Heavy breakable cast.	25.00 to 26.00
Cast iron carwheels	29.00 to 30.00
Malleable	27.00 to 28.00

Cleveland

No. 1 hvy. melting	$20.50 to $21.00
No. 2 hvy. melting	18.00 to 18.50
No. 1 busheling	20.50 to 21.00
No. 1 bundles	20.50 to 21.00
No. 2 bundles	16.00 to 16.50
Machine shop turn	12.00 to 12.50
Mixed bor. and turn.	16.50 to 17.00
Shoveling turnings	16.50 to 17.00
Cast iron borings	16.50 to 17.00
Low phos. 2 ft and under	22.50 to 23.00
Steel axle turn.	18.50 to 19.00
Drop forge flashings	20.50 to 21.00
No. 1 RR. hvy. melting	23.00 to 24.00
Rails 3 ft and under	30.00 to 31.00
Rails 18 in. and under	31.00 to 32.00
No. 1 machinery cast.	36.00 to 37.00
RR. cast.	36.00 to 37.00
RR. grate bars	27.00 to 28.00
Stove plate	29.00 to 30.00
Malleable	30.00 to 31.00

Youngstown

No. 1 hvy. melting	$24.50 to $25.00
No. 2 hvy. melting	19.50 to 20.00
No. 1 bundles	24.50 to 25.00
No. 2 bundles	17.50 to 18.00
Machine shop turn.	13.50 to 14.00
Shoveling turnings	17.50 to 18.00
Cast iron borings	17.50 to 18.00
Low phos. plate	24.50 to 25.00

Buffalo

No. 1 hvy. melting	$21.00 to $22.00
No. 2 hvy. melting	18.50 to 19.50
No. 1 busheling	18.50 to 19.50
No. 1 bundles	18.50 to 19.50
No. 2 bundles	16.50 to 17.50
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	14.50 to 15.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	14.50 to 15.00
Low phos. plate	23.00 to 24.00
Scrap rails, random lgth.	24.00 to 25.00
Rails 18 in. and under	29.00 to 30.00
RR. steel wheels	25.00 to 26.00
RR. spring steel	25.00 to 26.00
RR. couplers and knuckles	25.00 to 26.00
No. 1 cupola cast	29.00 to 30.00
Mixed yard cast	27.00 to 28.00
Stove plate	27.00 to 28.00
Small indus. malleable	19.50 to 20.50

Birmingham

No. 1 hvy. melting	$22.00
No. 2 hvy. melting	22.00
No. 2 bundles	20.00
No. 1 busheling	22.00
Machine shop turn.	15.00
Shoveling turnings	17.00
Cast iron borings	17.00
Bar crops and plate	28.00
Structural and plate	28.00
No. 1 RR. hvy. melt.	23.00
Scrap rails, random lgth.	25.00
Rerolling rails	30.00
Rails 2 ft and under	$25.00 to 26.00
Angles & splice bars	23.00 to 29.00
Std. steel axles	23.00 to 25.00
No. 1 cupola cast	34.00 to 35.00
Stove plate	29.00 to 30.00
Cast iron carwheels	23.00 to 24.00

St. Louis

No. 1 hvy. melting	$21.00 to $22.00
No. 2 hvy. melting	18.00 to 19.00
No. 2 bundled sheets	17.00 to 18.00
Machine shop turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Rails, random lengths	26.00 to 27.00
Rails 3 ft and under	30.00 to 31.00
Locomotive tires, uncut	22.00 to 23.00
Angles and splice bars	30.00 to 31.00
Std. steel car axles	32.00 to 33.00
RR. spring steel	24.00 to 25.00
No. 1 machinery cast.	32.00 to 34.00
Hvy. breakable cast.	25.00 to 26.00
Cast iron brake shoes	28.00 to 29.00
Stove plate	24.00 to 25.00
Cast iron car wheels	30.00 to 32.00
Malleable	27.00 to 29.00

New York

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$14.50 to $15.00
No. 2 hvy. melting	13.50 to 14.00
No. 2 bundles	12.50 to 13.00
Machine shop turn.	7.50 to 8.00
Mixed bor. and turn.	7.50 to 8.00
Shoveling turnings	8.50 to 9.00
Clean cast chem. bor.	13.00 to 13.50
No. 1 machinery cast.	22.00 to 24.00
Mixed yard cast.	20.00 to 21.00
Charging box cast	19.50 to 20.00
Heavy breakable cast	19.50 to 20.00
Unstrp. motor blocks	15.50 to 16.00

Boston

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$11.00 to $12.00
No. 2 hvy. melting	10.00 to 11.00
No. 1 bundles	10.50 to 11.50
No. 2 bundles	$ 9.50 to $10.50
Machine shop turn.	5.00 to 5.50
Mixed bor. and turn.	4.00 to 4.50
Shoveling turnings	6.00 to 6.50
No. 2 busheling	8.50 to 9.00
Clean cast chem. borings	10.50 to 11.00
No. 1 machinery cast	27.00 to 29.00
No. 2 machinery cast	19.00 to 22.50
Heavy breakable cast	16.00 to 17.00
Stove plate	18.50 to 20.50

Detroit

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$19.00 to $20.00
No. 2 hvy. melting	17.00 to 18.00
No. 1 bundles	19.00 to 20.00
New busheling	19.00 to 20.00
Flashings	19.00 to 20.00
Machine shop turn.	10.50 to 11.00
Mixed bor. and turn.	10.50 to 11.00
Shoveling turnings	11.50 to 12.00
Cast iron borings	11.50 to 12.00
Low phos. plate	19.00 to 20.00
No. 1 cupola cast	32.00 to 33.00
Heavy breakable cast	27.00 to 28.00
Stove plate	24.00 to 26.00
Automotive cast	32.00 to 33.00

Cincinnati

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$17.50 to $18.00
No. 2 hvy. melting	16.50 to 17.00
No. 1 bundles	17.50 to 18.00
No. 2 bundles	15.50 to 16.00
Machine shop turn.	8.00 to 9.00
Mixed bor. and turn.	9.00 to 10.00
Shoveling turnings	9.00 to 10.00
Cast iron borings	10.00 to 11.00
Low phos. 18 in. under	27.00 to 27.50
Rails, random lengths	29.00 to 30.00
Rails, 18 in. and under	34.00 to 36.00
No. 1 cupola cast	33.00 to 34.00
Hvy. breakable cast	29.00 to 30.00
Drop broken cast	37.00 to 38.00

San Francisco

No. 1 hvy. melting	$17.00
No. 2 hvy. melting	15.00
No. 1 bundles	13.00
No. 2 bundles	13.00
No. 3 bundles	10.00
Machine shop turn	9.00
Elec. fur. 1 ft and under	25.00
No. 1 RR. hvy. melting	17.00
Scrap rails, random lgth.	17.00
No. 1 cupola cast	$20.00 to 25.00

Los Angeles

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Mach. shop turn.	12.00
Elec. fur. 1 ft and under	30.00
No. 1 RR. hvy. melting	20.00
No. 1 cupola cast.	$30.00 to 31.00

Seattle

No. 1 hvy. melting	$16.00
No. 2 hvy. melting	16.00
No. 1 bundles	15.00
No. 2 bundles	15.00
No. 3 bundles	12.00
Elec. fur. 1 ft and under	21.00
RR. hvy. melting	19.00
No. 1 cupola cast	$20.00 to 27.00
Heavy breakable cast	20.00

Hamilton, Ont.

Cast grades f.o.b. shipping point:

No. 1 hvy. melting	$20.00
No. 1 bundles	20.00
No. 2 bundles	19.50
Mechanical bundles	18.00
Mixed steel scrap	16.00
Mixed bor. and turn.	14.00
Rails, remelting	20.00
Rails, rerolling	23.00
Bushelings	14.50
Bush., new fact, prep'd.	18.00
Bush., new fact, unprep'd.	13.00
Short steel turnings	14.00
Cast scrap	$33.00 to 35.00

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Flat-Rolled Steel: (cents per pound)	Aug. 23, 1949	Aug. 16, 1949	July 26, 1949	Aug. 24, 1948
Hot-rolled sheets	3.25	3.25	3.25	3.26
Cold-rolled sheets	4.00	4.00	4.00	4.00
Galvanized sheets (10 ga)	4.40	4.40	4.40	4.40
Hot-rolled strip	3.25	3.25	3.25	3.265
Cold-rolled strip	4.038	4.038	4.038	4.063
Plates	3.40	3.40	3.40	3.42
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	33.00	33.00	33.00	33.25
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes	$7.75	$7.75	$7.75	$6.80
Tinplate, electro (0.50 lb)	6.70	6.70	6.70	6.00
Special coated mfg. ternes	6.65	6.65	6.65	5.90
Bars and Shapes: (cents per pound)				
Merchant bars	3.35	3.35	3.35	3.37
Cold-finished bars	3.995	3.995	3.995	3.995
Alloy bars	3.75	3.75	3.75	3.75
Structural shapes	3.25	3.25	3.25	3.25
Stainless bars (No. 302)	28.50	28.50	28.50	28.25
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.15	4.15	4.15	4.256
Rails: (dollars per 100 lb)				
Heavy rails	$3.20	$3.20	$3.20	$3.20
Light rails	3.55	3.55	3.55	3.55
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$52.00	$52.00	$52.00	$52.00
Slabs, rerolling	52.00	52.00	52.00	52.00
Forging billets	61.00	61.00	61.00	61.00
Alloy blooms, billets, slabs	63.00	63.00	63.00	63.00
Wire rod and Skelp: (cents per pound)				
Wire rods	3.40	3.40	3.40	3.619
Skelp	3.25	3.25	3.25	3.25

Pig Iron: (per gross ton)	Aug. 23, 1949	Aug. 16, 1949	July 26, 1949	Aug. 24, 1948
No. 2, foundry, Phila.	$50.56	$50.56	$50.56	$49.26
No. 2, Valley furnace	46.50	46.50	46.50	43.50
No. 2, Southern Cin'ti*	45.47	45.47	45.47	49.47
No. 2, Birmngham	39.38	39.38	39.38	43.38
No. 2, foundry, Chicago†	46.50	46.50	46.50	43.00
Basic del'd Philadelphia*	49.74	49.74	49.74	48.76
Basic, Valley furnace	46.00	46.00	46.00	43.00
Malleable, Chicago†	46.50	46.50	46.50	43.50
Malleable, Valley	46.50	46.50	46.50	43.50
Charcoal, Chicago	73.78	73.78	73.78	69.55
Ferromanganese‡	173.40	173.40	173.40	145.00

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.
*Does not include interim increase on total freight charges effective Jan. 11, 1949.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$23.25	$22.75	$20.75	$42.75
Heavy melt'g steel, Phila.	20.00	18.25	17.50	45.00
Heavy melt'g steel, Ch'go	22.50	22.50	19.75	41.75
No. 1 hy. comp. sh't Det.	19.50	16.50	12.75	28.00
Low phos. Young'n	24.75	24.75	20.75	47.75
No. 1, cast, Pittsburgh	34.50	34.50	27.00	65.00
No. 1, cast, Philadelphia	30.50	30.00	27.50	65.50
No. 1, cast, Chicago	40.50	40.50	31.50	74.50
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$15.00
Foundry coke, prompt	15.75	15.75	16.25	17.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	17.625	17.625	17.625	23.50
Copper, Lake Conn.	17.75	17.75	17.75	23.625
Tin, Grade A, New York	$1.03	$1.03	$1.03	$1.03
Zinc, East St. Louis	10.00	10.00	10.00	15.00
Lead, St. Louis	14.925	14.80	14.05	19.30
Aluminum, virgin	17.00	17.00	17.00	16.00
Nickel electrolytic	42.93	42.93	42.93	42.90
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	38.50	38.50	38.50	35.00

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
Aug. 23, 1949	3.705¢ per lb.	$45.91 per gross ton	$21.92 per gross ton
One week ago	3.705¢ per lb.	45.91 per gross ton	21.17 per gross ton
One month ago	3.705¢ per lb.	45.91 per gross ton	19.33 per gross ton
One year ago	3.720¢ per lb.	44.52 per gross ton	43.16 per gross ton

	High		Low		Pig Iron High		Pig Iron Low		Scrap Steel High		Scrap Steel Low	
1949	3.720¢	Jan. 1	3.705¢	May 3	$46.82	Jan. 4	$45.91	May 10	$43.00	Jan. 1	$19.33	June 28
1948	3.721¢	July 27	3.193¢	Jan. 1	46.91	Oct. 12	39.58	Jan. 6	43.16	July 27	39.75	Mar. 9
1947	3.193¢	July 29	2.848¢	Jan. 1	37.98	Dec. 30	30.14	Jan. 7	42.58	Oct. 28	29.50	May 20
1946	2.848¢	Dec. 31	2.464¢	Jan. 1	30.14	Dec. 10	25.37	Jan. 1	31.17	Dec. 24	19.17	Jan. 1
1945	2.464¢	May 29	2.396¢	Jan. 1	25.37	Oct. 23	23.61	Jan. 2	19.17	Jan. 2	18.92	May 22
1944	2.396¢		2.396¢		$23.61		$23.61		19.17	Jan. 11	15.76	Oct. 24
1943	2.396¢		2.396¢		23.61		23.61		$19.17		$19.17	
1942	2.396¢		2.396¢		23.61		23.61		19.17		19.17	
1941	2.396¢		2.396¢		$23.61	Mar. 20	$23.45	Jan. 2	$22.00	Jan. 7	$19.17	Apr. 10
1940	2.30467¢	Jan. 2	2.24107¢	Apr. 16	23.45	Dec. 23	22.61	Jan. 2	21.83	Dec. 30	16.04	Apr. 9
1939	2.35367¢	Jan. 3	2.26689¢	May 16	22.61	Sept. 19	20.61	Sept. 12	22.50	Oct. 3	14.08	May 16
1938	2.58414¢	Jan. 4	2.27207¢	Oct. 18	23.25	June 21	19.61	July 6	15.00	Nov. 22	11.00	June 7
1937	2.58414¢	Mar. 9	2.32263¢	Jan. 4	23.25	Mar. 9	20.25	Feb. 16	21.92	Mar. 30	12.67	June 9
1936	2.32263¢	Dec. 28	2.05200¢	Mar. 10	19.74	Nov. 24	18.73	Aug. 11	17.75	Dec. 21	12.67	June 8
1935	2.07642¢	Oct. 1	2.06492¢	Jan. 8	18.84	Nov. 5	17.83	May 14	13.42	Dec. 10	10.33	Apr. 29
1934	2.15367¢	Apr. 24	1.95757¢	Jan. 2	17.90	May 1	16.90	Jan. 27	13.00	Mar. 13	9.50	Sept. 25
1933	1.95578¢	Oct. 3	1.75836¢	May 2	16.90	Dec. 5	13.56	Jan. 3	12.25	Aug. 8	6.75	Jan. 3
1932	1.89196¢	July 5	1.83901¢	Mar. 1	14.81	Jan. 5	13.56	Dec. 6	8.50	Jan. 12	6.43	July 5
1931	1.99626¢	Jan. 13	1.86586¢	Dec. 29	15.90	Jan. 6	14.79	Dec. 15	11.33	Jan. 6	8.50	Dec. 29
1929	2.31773¢	May 28	2.26498¢	Oct. 29	18.71	May 14	18.21	Dec. 17	17.58	Jan. 29	14.08	Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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STEEL PRICES

PRODUCTS	Base prices at producing points apply to the sizes and grades produced in these areas														
	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		Detroit	Johnstown	Seattle, S. Frisco, LosAngeles	Fontana
INGOTS Carbon forging	$50.00											$50.00			
Alloy	$51.00						(per net ton)					$51.00			
BILLETS, BLOOMS, SLABS Carbon, rerolling [10]	$52.00				$52.00	$52.00	(per net ton)						$52.00		$71.00
Carbon forging billets	$61.00	$61.00	$61.00	$61.00	$61.00	$61.00	(per net ton)					$61.00	$61.00		$80.00
Alloy	$63.00	$63.00				$63.00	(Bethlehem, Canton, Massillon =$63.00) (per net ton)					$63.00			$82.00
PIPE SKELP	3.25						3.25				Warren =3.25				
WIRE RODS	3.40	3.40		3.40	3.40		3.40	3.50			Worcester 3.70		3.40	4.05[11] 4.20[12]	
SHEETS Hot-rolled [4]	3.25	3.25	3.25	3.25	3.25	3.25 (Conshohocken, Pa. 3.35)	3.25	3.25		Warren, Ashland =3.25		3.45		3.95[13]	4.15
Cold-rolled	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.20	4.00	Warren 4.00	4.20		Pittsburg, Cal.=4.95	4.90
Galvanized (10 gage)	4.40	4.40	4.40		4.40		4.40	4.40	Canton =4.40	4.40	Ashland =4.40			5.15[13]	
Enameling (12 gage)	4.40	4.40	4.40	4.40			4.40		4.60	4.40		4.70			
Long ternes (10 gage)	4.80		4.80							4.80					
STRIP Hot-rolled [1]	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25		3.25	Warren =3.25	3.45		4.00 to 4.25	4.40
Cold-rolled [2]	4.00	4.15		4.00		4.00	4.00	4.00		New Haven=4.50 Warren=4.00 to 4.25		4.20 to 4.25			4.90
TINPLATE Cokes, 1.50 lb.[3] base box	$7.75	$7.75	$7.75		$7.85			$7.85	$7.95	Warren, Ohio =$7.75				Pittsburg, Cal.=$8.50	
Electrolytic 0.25, 0.50, 0.75 lb. box	Deduct $1.30, $1.05 and 75¢ respectively from 1.50 lb. coke base box price														
TERNES MFG., special coated	Deduct $1.10 from 1.50 lb. coke base box price														
BLACKPLATE CANMAKING 55 to 128 lb.	Deduct $2.00 from 1.50 lb. coke base box price														
BLACKPLATE, h.e., 29 ga.[8]	5.30	5.30	5.30					5.40		Warren, Ohio =5.30					
BARS Carbon Steel	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35		3.35	Canton =3.35	3.55	3.35	4.05 to 4.10[14]	4.00
Reinforcing [5]	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35			Canton =3.35		3.35	4.05 to 4.10[14]	4.00
Cold-finished [6]	3.95 to 4.00	4.00	4.00	4.00		4.00	4.00					4.30			
Alloy, hot-rolled	3.75	3.75	3.75			3.75	3.75	Bethlehem, Canton, Massillon=3.75				4.05	3.75	4.80[12]	4.75
Alloy cold-drawn	4.65	4.65	4.65	4.65		4.65	4.65	Massillon=4.65			Worcester 4.95				
PLATE Carbon steel [9]	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40 Coatesville=3.50, Claymont=3.50				3.65	3.40	4.30[14]	4.00
					Conshohocken=3.50			Geneva=3.40, Harrisburg=3.50							
Floor plates	4.55	4.55		4.55				Conshohocken, Harrisburg =4.55							
Alloy	4.40	4.40	4.40						Coatesville=4.50						
SHAPES, Structural	3.25	3.25	3.25		3.25	3.30	Bethlehem=3.30, Geneva, Utah=3.25						3.30	3.80 to 3.90[14]	3.80
MANUFACTURERS' WIRE [7] Bright	4.15	4.15		4.15	4.15		4.15	4.25	Duluth=4.15, Worcester=4.45				4.15	5.15[11]	
Spring (high carbon)	5.20	5.20		5.20				5.30	Worcester=5.50 New Haven, Trenton=5.50				5.20	Duluth= 5.20-6.15	
PILING, Steel sheet	4.05	4.05				4.05									

Steel prices shown above are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Widths up to 12-in. inclusive. (2) 0.25 carbon and less. (3) Cokes, 1.25 lb. deduct 25¢ per base box. (4) 18 gage and heavier. (5) For straight length material only from producers to fabricators. (6) Also shafting. For quantities of 40,000 lb and over. (7) Carload lot in manufacturing trade. (8) Hollowware enameling gages 29 to 31 only. (9) Produced to dimensional tolerances in AISI Manual Sec. 6. (10) Sinb prices subject to negotiation in most cases. (11) San Francisco only. (12) Los Angeles only. (13) San Francisco and Los Angeles only. (14) Seattle only. (15) Seattle and Los Angeles only.

UNIVERSITY OF MICHIGAN LIBRARIES

PIPE AND TUBING

Base discounts, f.o.b. mills, Base price, about $200.00 per net ton.

Standard, Threaded and Coupled

Steel, buttweld*	Black	Galv.
⅛-in.	43 to 41	26½ to 24½
¼-in.	46 to 44	30½ to 28½
1-in.	48½ to 46½	33½ to 31½
1¼-in.	49 to 47	34 to 32
1½-in.	49½ to 47½	34½ to 32½
2-in.	50 to 48	35 to 33
2½ to 3-in.	50½ to 48½	35½ to 33½
Steel, lapweld		
2-in.	39½	26 to 24
2½ to 3-in.	43½ to 42½	28 to 27
3½ to 6-in.	46½ to 42½	31 to 27
Steel, seamless		
2-in.	38½ to 27	23 to 11½
2½ to 3-in.	41½ to 32½	26 to 17
3½ to 6-in.	43½ to 38½	28 to 23
Wrought Iron, buttweld		
⅛-in.	+20½	+47
¼-in.	+10½	+36
⅜ & ½ in.	+ 4½	+27
¾-in.	— 1½	+23½
1-in.	— 2	+23
Wrought Iron, lapweld		
⅛-in.	+ 7½	+31
¼ to 3½-in.	+ 5	+26½
4-in.	list	+20½
4½ to 8-in.	+ 2	+22

Extra Strong, Plain Ends

Steel, buttweld		
⅛-in.	42 to 40	27 to 25
¼-in.	46 to 44	31 to 29
1-in.	48 to 46	34 to 32
1¼-in.	48½ to 46½	34½ to 32½
1½-in.	49 to 47	35 to 33
2-in.	49½ to 47½	35½ to 34½
2½ to 3-in.	50 to 48	36 to 34
Steel, lapweld		
2-in.	39½ to 38½	25 to 24
2½ to 3-in.	44½ to 42½	30 to 28
3½ to 6-in.	48 to 44	33½ to 31½
Steel, seamless		
2-in.	37½ to 32½	23 to 18
2½ to 3-in.	41½ to 36½	27 to 23
3½ to 6-in.	45	30½
Wrought Iron, buttweld		
⅛-in.	+16	+40
¼-in.	+ 9½	+34
1 to 2-in.	— 1½	+23
Wrought Iron, lapweld		
2-in.	+ 4½	+27½
2½ to 4-in.	— 5	+16
4½ to 6-in.	— 1	+20½

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. *Fontana, Calif., deduct 11 points from figures in left columns.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.

OD in.	Gage BWG	Seamless H.R.	Seamless C.R.	Electric H.R.	Weld C.D.
2	13	$19.18	$22.56	$18.60	$21.89
2½	12	25.79	30.33	25.02	29.41
3	12	28.68	33.76	27.82	32.74
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78

CAST IRON WATER PIPE

	Per net ton
6 to 24-in., del'd Chicago	$95.70
6 to 24-in., del'd N. Y.	$92.50 to 97.40
6 to 24-in., Birmingham	$82.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	109.30

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
½ in. & smaller x 6 in. & shorter	35
9/16 & ⅝ in. x 6 in. & shorter	37
¾ in. & larger x 6 in. shorter	34
All diam., longer than 6 in.	30
Lag, all diam over 6 in. longer	35
Lag, all diam x 6 in. & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	35
9/16 to 1 in. inclusive	34
1⅛ to 1½ in. inclusive	32
1⅝ in. and larger	27

On above bolts and nuts, excepting plow bolts, additional allowances of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifinished Hexagon Nuts

	USS	SAE
7/16 in. and smaller	..	41
½ in. and smaller	38	..
⅝ in. through 1 in.	..	39
9/16 in. through 1 in.	37	
1⅛ in. through 1½ in.	35	37
1⅝ in. and larger	28	..

In full case lots, 15 pct additional discount.

Stove Bolts

Packages, nuts separate	$61.75
In bulk	70.00

Large Rivets

(½ in. and larger)

	Base per 100 lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

(7/16 in. and smaller)

	Pct off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

(In packages)	Pct Off List
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46
¾ to 1 in. x 6 in., SAE (1035), heat treated	35
Milled studs	19
Flat head cap screws, listed sizes	5
Fillister head cap, listed sizes	28

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill.

Effective CaF, Content:	Base price per net ton
70% or more	$37.00
60% or less	34.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per gross ton
Old range, bessemer	$7.60
Old range, nonbessemer	7.45
Mesabi, bessemer	7.35
Mesabi, nonbessemer	7.20
High phosphorus	7.20

After Dec. 31, 1948, increases or decreases in Upper Lake freight, dock and handling charges and taxes thereon to be for the buyers' account.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.9¢ to 9.0¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	31.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8%+ Fe	90.0¢ to $1.75
Aluminum	27.00¢
Antimony	53.73¢
Brass, 10 ton lots	23.00 to 25.25¢
Copper, electrolytic	27.75¢
Copper, reduced	27.625¢
Cadmium	$2.40
Chromium, electrolytic, 99% min.	$3.50
Lead	20.06¢
Manganese	48.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	66.00¢
Nickel, spherical, minus 30 mesh, unannealed	68.00¢
Silicon	34.00¢
Solder powder	8.5¢ plus metal cost
Stainless steel, 302	75.00¢
Tin	$1.15 to $1.25
Tungsten, 99%	$2.90
Zinc, 10 ton lots	15.25 to 18.00¢

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.00 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$15.50 to $16.00
Foundry, oven coke	
Buffalo, del'd	$22.90
Chicago, f.o.b.	20.40
Detroit, f.o.b.	19.40
New England, del'd	22.70
Seaboard, N. J., f.o.b.	22.00
Philadelphia, f.o.b.	20.45
Swedeland, Pa., f.o.b.	20.40
Plainesville, Ohio, f.o.b.	20.90
Erie, del'd	$21.50 to 23.50
Cleveland, del'd	22.45
Cincinnati, del'd	21.50
St. Paul, f.o.b.	23.50
St. Louis, del'd	20.98
Birmingham, del'd	18.66

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Carloads, Per 1000
First quality, Pa., Ky., Mo., Ill. (except Salina, Pa., add $5)	$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	11.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	$85.00 to 95.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	$14.75 to 15.00
Silica cement, net ton, bulk, Utah and Calif.	21.00

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt., Chester	$69.00

Magnesite Brick

Standard, Balt. and Chester	$91.00
Chemically bonded, Balt. and Chester	80.00

Grain Magnesite

Std. ⅜-in. grains

Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	$56.00 to 56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	$30.50 to 31.00
in sacks with fines	35.00 to 35.50

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk, Midwest, add 10¢: Missouri Valley, add 20¢ | $12.25

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	Chromium Nickel							Straight Chromium		
	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	12.75	13.50	15.00	15.50	22.75	18.25	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	24.50	26.75	15.00	18.50	15.25
Forg. discs, die blocks, rings	30.50	30.50	33.00	32.80	49.00	36.50	41.00	24.50	25.00	25.00
Billets, forging	24.25	24.25	26.25	25.50	39.00	29.00	32.75	19.50	20.00	30.00
Bars, wire, structurals	28.50	28.50	31.00	30.00	46.00	34.00	38.50	23.00	23.50	23.50
Plates	32.00	32.00	34.80	34.00	50.50	39.50	44.00	26.00	26.50-27.00	26.50
Sheets	37.50	37.50	39.50	39.50	53.00	45.50	50.00	33.00	33.50	35.50
Strip, hot-rolled	24.25	25.75	30.00	27.75	46.00	34.50	38.75	21.25	28.00	21.75
Strip, cold-rolled	30.50	33.00	36.50	35.00	55.00	44.50	48.50	27.00	33.50	27.50

ELECTRODES

Cents per lb. f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
Carbon		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	$1.42
18	4	2	—	—	$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢

High-carbon-chromium ..... 52¢
Oil hardened manganese ..... 29¢
Special carbon ..... 26.5¢
Extra carbon ..... 22¢
Regular carbon ..... 19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

ELECTRICAL SHEETS

24 gage, HR cut lengths, f.o.b. mill

	Cents per lb
Armature	5.45
Electrical	5.95
Motor	6.70
Dynamo	7.50
Transformer 72	8.05
Transformer 65	8.60
Transformer 58	9.30
Transformer 52	10.10

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb $3.20
Joint bars, 100 lb 4.25
Light rails per 100 lb 3.55

	Base Price cents per lb
Track spikes	5.35
Axles	5.20
Screw spikes	8.00
Tie plates	4.05
Tie plates, Pittsburg, Calif.*	4.20
Track bolts, untreated	8.25
Track bolts, heat treated, to railroads	8.50

*Seattle, add 30¢.

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon ..... 4.00¢
0.41 to 0.60 carbon ..... 5.50¢
0.61 to 0.80 carbon ..... 6.10¢
0.81 to 1.05 carbon ..... 8.05¢
1.06 to 1.35 carbon ..... 10.35¢
Worcester, add 0.30¢.

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct,		
Coatesville, Pa.	*26.50	
Washington, Pa.	*26.50	*22.50
Claymont, Del.	*26.50	
Conshohocken, Pa.		*22.50
Nickel-carbon		
10 pct, Coatesville	27.50	
Inconel-carbon		
19 pct Coatesville	36.00	
Monel-carbon		
10 pct, Coatesville	29.00	
No. 302 Stainless-copper-stainless, Carnegie, Pa.		75.00
Aluminized steel sheets		
Hot dip, Butler, Pa.		7.75

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column Pittsburg, Calif.	
Standard & coated nails*	103	122
Galvanized nails*	103	122
Woven wire fence†	109	132
Fence posts, carloads††	112	...
Single loop bale ties	106	130
Galvanized barbed wire**	123	143
Twisted barbless wire	123	...

* Pgh., Chi., Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth, Joliet and Johnstown.

	Base per 100 lb	*Pittsburg, Calif.*
Annealed fence wire‡	$4.80	$5.75
Annealed, galv. fencing‡	5.25	6.20
Cut nails, carloads‡‡	6.75	...

‡ Add 30¢ at Worcester; 10¢ at Sparrows Pt.
‡‡ Less 20¢ to jobbers.

HIGH STRENGTH, LOW ALLOY STEELS

Mill base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	HI Steel	Mayari R	Otiscoloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic Sharon*	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Sharon*
Plates	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.45
Sheets									
Hot-rolled	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.95	5.15
Cold-rolled	6.05	6.05	6.05	.....	6.05	6.05	6.05	6.05	6.25
Galvanized	.....	6.75	.....	.....	.....	6.75	.....	.....	.....
Strip									
Hot-rolled	4.95	4.95	4.95	.....	4.95	4.95	4.95	4.95	5.15
Cold-rolled	.....	.....	6.05	.....	.....	6.05	6.05	6.05	6.25
Shapes	.....	4.95	.....	.....	4.95	5.05	4.95	4.95	.....
Bars									
Hot-rolled	5.10	5.10	5.10	.....	5.10	5.10	5.10	5.10	5.30
Bar shapes	.....	5.10	.....	.....	5.10	5.10	5.10	5.10	.....

* Sheets and strip.

UNIVERSITY OF MICHIGAN LIBRARIES

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb. (Metropolitan area delivery, add 15c to base price except Cincinnati and New Orleans (*), add 10c; New York, add 20c.)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS			ALLOY BARS		
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Baltimore	5.31	6.21-6.41	6.95-7.11	5.37	....	5.56	5.36	5.42	6.16	....	9.60-10.10	....	....
Birmingham	5.00	....	6.40	5.00	....	5.15	5.00	5.10	6.57	....	....	....	....
Boston	5.55	6.45-6.75	7.11-7.61	5.60-5.95	6.75	5.80	5.42	5.52	6.27	9.67-9.79	10.04-10.07	11.23	11.47
Buffalo	4.85	5.75	7.42-7.57	5.24	7.27	5.35	5.00	4.95	5.40	9.36	9.60	10.65	10.95
Chicago	4.85	5.75	6.85	4.85	5.45-6.15	5.10	4.90	4.90	5.48	8.90	9.26	10.25	10.55
Cincinnati*	5.16-5.51	5.84-6.28	6.59-6.93	5.28-5.43	....	5.53-5.85	5.33	5.33-5.48	6.08-6.20	9.74	9.99	11.19	11.44
Cleveland	4.85	5.75	6.70	5.03	....	5.21	5.01	5.01	5.45	9.05	9.35	10.40	10.70
Detroit	5.28-5.32	6.07-6.18	7.38-7.58	5.27-5.47	6.27-6.58	5.52-5.57	5.33-5.40	5.33-5.55	6.00-6.10	9.87	9.92	11.11	11.35
Houston	6.70-6.95	....	7.30	6.70	....	6.70	6.20-6.70	6.40-6.65	7.60	10.45	10.40	11.45	11.70
Indianapolis	5.29	6.13	7.44	5.29	7.36	5.54	5.34	5.34	6.14	11.25	11.39	....	....
Kansas City	5.45	6.35	7.40-7.45	5.45	6.05-6.90[5]	5.70	5.50	5.50	6.05	9.50	8.30	10.85	9.65
Los Angeles	6.45	7.90	7.45	6.65	7.35[20]	6.15	5.95	6.10	7.98[14]	10.95[15]	10.90[15]	12.45[15]	12.70[15]
Memphis	5.75-5.80	6.60	7.20	5.80-5.95	6.80	5.95-6.00	5.75	5.75	6.53	....	....	....	....
Milwaukee	5.03	5.93	7.02	5.03-5.38	6.32	5.28	5.08	5.08	5.63	9.53	9.73	10.98	11.23
New Orleans*	5.95	6.75	....	6.15	....	6.15	5.95	5.95	6.65[6]	....	....	....	....
New York	5.40	6.31	6.85-6.90	5.62	6.76	5.65	5.33	5.57	6.38	9.28	9.58	10.63	10.93
Norfolk	6.00	....	....	6.20	....	6.05	6.05	6.05	7.85	....	....	....	....
Omaha	6.13	....	8.33	6.13	....	6.38	6.18	6.18	6.98	....	....	....	....
Philadelphia	5.05	6.24[13]	6.58	5.40	6.29	5.35	5.10	5.40	5.94	9.05	9.35	10.62	10.87
Pittsburgh	4.85	5.75	6.90	5.00	6.00	5.05	4.90	4.90	5.40	8.90	9.20	10.25	10.55
Portland	6.50[3]-7.05	8.00	8.80-9.10	6.85[3]	....	6.30[3]	6.35[3]	6.35[3]	8.25[14]	10.50[6]	10.10[6]	....	....
Salt Lake City	7.05	7.05	8.65-8.65	7.45[3]	....	5.65[3]	5.50[3]	7.10[3]	8.15	....	....	....	....
San Francisco	6.15[3]	7.50[2]	7.80	6.75[3]	8.25[3]	6.35[3]	5.90[3]	5.90[3]	7.55	10.90[15]	10.85[15]	12.40[15]	12.65[15]
Seattle	6.70[4]-7.10	8.15[2]-8.65	8.80-9.30	6.70[4]	....	6.35[4]	6.30[4]	6.20[4]	8.15[14]	....	10.35[15]	....	13.10[15]
St. Louis	5.22-5.37	6.12-6.27	7.32	5.22	6.68-7.54	5.47	5.27	5.27	5.82	9.27-9.72	9.57-9.97	10.62-11.17	10.92-11.42
St. Paul	5.44	6.19-6.34	7.54-7.64	5.44	6.82	5.64-6.69	5.49	5.49	6.64	9.49	9.79	10.84	11.14

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED:
Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED:
Sheets, 400 to 1499 lb strip, extras on all quantities. Bars 1000 lb and over.

ALLOY BARS:
1000 to 1999 lb.

GALVANIZED SHEETS:
450 to 1499 lb.

EXCEPTIONS:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb; (18) 1000 to 1499 lb; (19) 1500 to 3499 lb; (20) 6000 lb and over.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 4 pct tax on freight nor the 6 pct increase on total freight charges in the Eastern Zone (5 pct Southern Zone, 4 pct Western Zone), effective Jan. 11, 1949.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	.....	.....	.....	.....
Birmingham	38.88	39.38	.....	.....	.....
Buffalo	46.00	46.50	47.00	.....	.....
Chicago	46.00	46.50	46.50	47.00	.....
Cleveland	46.00	46.50	46.50	47.00	51.00
Duluth	46.00	46.50	46.50	47.00	.....
Erie	46.00	46.50	46.50	47.00	.....
Everett	.....	50.00	50.50	.....	.....
Granite City	47.90	48.40	48.90	.....	.....
Ironton, Utah	46.00	46.50	.....	.....	.....
Lone Star, Texas	46.00	46.50†	.....	.....	.....
Neville Island	46.00	46.50	46.50	.....	.....
Geneva, Utah	46.00	46.50	.....	.....	.....
Sharpsville	46.00	46.50	46.50	47.00	.....
Steelton	48.00	48.50	49.00	49.50	54.00
Struthers, Ohio	46.00	.....	.....	.....	.....
Swedeland	46.00	46.50	49.00	49.50	.....
Toledo	46.00	46.50	46.50	47.00	.....
Troy, N. Y.	48.00	48.50	49.00	.....	54.00
Youngstown	46.00	46.50	46.50	47.00	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	.....	50.00	50.50	.....	.....
Boston	Steelton	6.27	54.27	54.77	55.27	55.77	60.27
Brooklyn	Steelton	5.48	.....	53.98	54.48	54.98	59.48
Cincinnati	Birmingham	6.09	44.97	45.47	.....	.....	.....
Jersey City	Steelton	3.67	.....	52.17	52.67	53.17	57.67
Los Angeles	Geneva-Ironton	7.13	53.13	53.63	.....	.....	.....
Mansfield	Cleveland-Toledo	3.03	49.03	49.53	49.53	50.03	54.03
Philadelphia	Bethlehem	2.17	50.17	.....	.....	.....	.....
Philadelphia	Swedeland	1.31	49.31	49.81	50.31	50.81	.....
Philadelphia	Steelton	2.81	50.81	51.31	51.81	52.31	56.81
San Francisco	Geneva-Ironton	7.13	53.13	53.63	.....	.....	.....
Seattle	Geneva-Ironton	7.13	53.13	53.63	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	.....	.....
Gulf Ports	Lone Star, Texas	.....	50.50	51.00†	.....	.....	.....

† Low Phos., Southern Grade.

Producing point prices are subject to switching charges; silicon differential (not to exceed 50c per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38c per ton for phosphorus content of 0.70 pct and over manganese differentials, a charge not to exceed 50c per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio—$59.50; f.o.b. Buffalo, $60.75. Add $1.00 per ton for each additional 0.50 pct Si up to 17 pct. Add 50c per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $66.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $73.78. High phosphorus charcoal pig iron is not being produced.

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Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size.

F.o.b. Birmingham	$174
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont.	$172
F.o.b. Johnstown, Pa.	$174
F.o.b. Sheridan, Pa.	$172
F.o.b. Etna, Pa.	$175

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.45
Ton lots	12.05
Less ton lots	12.95

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$64.00	$65.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	35.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Si	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	8.95
Ton lots	10.60
Briquet, contract basis carlots, bulk delivered, per lb of briquet	10.30
Ton lots	11.90
Less ton lots	12.80

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $77.00 gross ton, freight allowed to normal trade area; Si 15.01 to 15.50 pct, f.o.b Niagara Falls, N. Y., $73.50. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	6.30
Ton lots	7.90
Less ton lots	8.80

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.

25% Si	18.50
50% Si	11.30
75% Si	13.50
85% Si	14.65
90-95% Si	16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si)

0.06% C	28.75
0.10% C	28.25
0.15% C	28.00
0.20% C	27.75
0.50% C	27.50
1.00% C	27.25
2.00% C	27.00
65-69% Cr, 4-9% C	20.50
62-66% Cr, 4-6% C, 6-9% Si	21.35

Briquets — Contract price, cents per pound of briquet, delivered, 60% chromium.

Carload bulk	13.75
Ton lots	15.25
Less ton lots	16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, cents per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% max. C	1.09
0.50% max. C	1.05
9.00% min. C	1.04

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11% Ca 5 to 7%.

Carload packed	17.00¢
Ton lots to carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained, V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5	$1.20
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.	
Ton lots	$2.90
Less ton lots	2.95
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo.	$1.10
Calcium molybdate, 45-50%, f.o.b. Langeloth, Pa., per pound contained Mo.	96¢
Molybdenum oxide briquets, f.o.b. Langeloth, Pa.; bags, f.o.b. Wash., Pa., per pound contained Mo.	95¢
Ferrotitanium, 40%, regular grade, 10% C max., f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.25
Ferrotitanium, 25%, low carbon, f.o.b. Niagara Falls, N.Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.40
Less ton lots	1.45
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, carloads per net ton	$160.00
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per pound of alloy.	
Carload, bulk	6.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	7.40¢
Ton lots	8.80¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk, lump	11.00¢
Ton lots, bulk, lump	11.50¢
Ton lots, packed, lump	11.75¢
Less ton lots, lump	12.25¢

Boron Agents

Contract prices, per lb of alloy, del.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lot	$1.20
F.o.b. Wash., Pa.; 100 lb and over	
10 to 14% B.	.75
14 to 19% B.	1.20
19% min. B.	1.50
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcaz, contract basis, delivered	
Ton lots	45.00¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y.; freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.625¢
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$4.25

Fatigue Cracks

Continued from Page 18

BEER

Major topic of conversation in Pittsburgh is not smoke abatement, not John L. Lewis, not steel labor, not stream pollution. Big event of the year is the decree that bars must take down their elaborate overhanging beer signs by Sept. 1.

Not long after repeal, the first neon lighted masterpiece made its appearance hanging out over the entrance to a local oasis. Soon you could look down almost any Pittsburgh street and see a dazzling array. "Fort Pitt," "Duquesne," and "Iron City" brew signs overhung the sidewalks like the limbs of a fir forest. The beer companies supplied the signs, the tavern keepers paid for the electricity. The electric sign manufacturers were happiest of all. A secret survey by the Pittsburgh Chamber of Commerce was rumored to have shown more candlepower than Times Square.

Now all this must halt. The lights will go out in Pittsburgh as surely as they did in Piccadilly in the fall of '39. Only the glow of the bessemers will light the homeward way for Pittsburghers. Before long, the city fathers will, we understand, be taking bids on a complete new street lighting system.

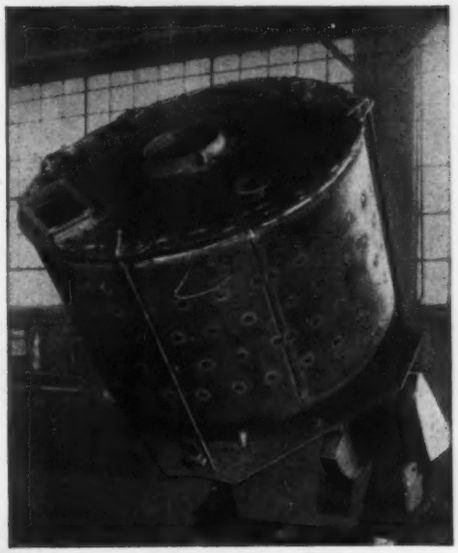
AIR CONDITIONED

Loyal readers will be gratified to know that the nerve center of your f.f.j. in New York is air conditioned this summer of all summers. That is to say, an elaborate network of air ducts and fans weaves its way around the ceiling creating a gentle zephyr in even the farthest corners.

The only catch is that the air intakes are located on the outside of the building. In the chill of winter, when the shivering minions enter the office blowing on their hands, there is plenty of coel air coming down from overhead. During the heat of summer, the system is just as good as any forced draft warm air furnace ever built.

All this is leading up to a new project by the reader research committee. Spearheaded by an eminent psychologist, the committee is attempting to determine whether there is a correlation between the air conditioning system and the editorial content of your f.f.j. In winter, it is asserted, articles tend to be cold and logical. In summer, editorial opinion is warm and breezy. Not, you understand, inflated with hot air.

Resume Reading on Page 19



"for Quality Weldments,

call in

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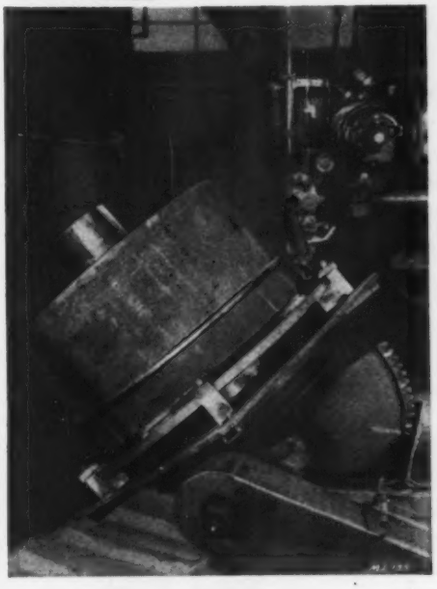

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Consult us about your requirements—no obligation, of course. The Van Dorn Iron Works Co., 2685 East 79th St., Cleveland 4, Ohio.

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Dear Editor . . .

Letters From Our Readers

READERS' VIEWS ON NEW FORMAT

(Below is a weighted cross-section of our reader's reaction to the new IRON AGE format which first appeared in the Aug. 4 issue. Up to date the score is: 82.9 pct think it is good; 5.7 pct have reservations; and 11.4 pct don't like it.—Ed.)

Sir:

While IRON AGE has always been an excellent magazine, it is even more readable now because of the changes in format, arrangement and presentation of material.

CARL G. DE LAVAL
President
Pittsburgh Alloy Corp.
Pittsburgh

Sir:

Congratulations on your new makeup. I like it. You have proven that it is possible to improve on the one magazine I thought could not be improved upon.

L. M. WORTH
Dearborn

Sir:

First, I noted that the index is in the front of the book where it should be. Now we can find it. You are also to be congratulated on the very fine editorial. It, too, is in a good location. Then, I like your free circular page. It's a decided improvement. On the whole, you have done a real job.

EDWARD L. SOLOMON
President
Max Solomon Co.
Pittsburgh

Sir:

I am afraid that it is too early to give opinions, but I can give impressions. They are all negative, since I could not find what I was looking for, and found the usual material pretty well spread out as compared with the previous format.

FRANKLIN S. CATLIN, JR.
Technical Coordinator
Magnaflux Corp.
Chicago

Sir:

Your efforts in making all editorial matter more readable are commendable. In addition, the organization of the material from readership interest and viewpoint is certainly an improvement over the former format.

H. C. MCDANIEL
Manager, Technical Press Service
Westinghouse Electric Corp.
Pittsburgh

Sir:

Congratulations on the new format and styling. The changes add freshness as well as a distinct improvement in readability.

A. M. RIDDLE
Manager Market Research Dept.
Colorado Fuel and Iron Corp.
Denver

Sir:

I have looked over the makeup and arrangement and like the location of the contents page and arrangement of subject headings. Although it can stand additional improvements, I want to compliment you on a very fine and informative publication.

DOUGLAS T. HAMILTON
Fellows Gear Shaper Co.
Springfield, Vt.

Sir:

I am one of those old fashioned fellows who take some time to adjust to changes. I like THE IRON AGE as it was. In time I may get used to the changes and will like it equally well.

MARCUS A. FOLLANSBEE
President
Follansbee Steel Corp.
Pittsburgh

Sir:

It is definitely improved, and I congratulate you on the forward steps in composition that you have taken.

THEODORE F. SMITH
Oliver Iron & Steel Corp.
Pittsburgh

Sir:

The new look is certainly refreshing. I like the white spaces and the selection of type.

CHARLES M. REESEY
Advertising Manager
Cincinnati Milling Machine Co.
Cincinnati

Sir:

Congratulations on the new makeup.

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It looks great; the material is easier to find and to read.

EDMUND RUFFIN
General Motors Corp.
Detroit

Sir:

The new format and face lift doesn't affect me either way. I have always made the time required to read your magazine, and will continue to do so no matter what the format, as long as the editorial excellence stays where it is.

GEORGE BLACK
Copper Alloy Foundry Co.
Hillside, N.J.

Sir:

IRON AGE'S new suit fits well, but I believe it can still stand some minor alterations.

F. R. DANIELS
Waterbury Farrel Foundry & Machine Co.
Waterbury, Conn.

Sir:

I did not think it possible for IRON AGE to be any better, but I was mistaken. The new format is a great improvement on any previous issues in all my many years of reading your fine publication.

K. C. PHELPS
Central Tool Section
Naval Air Station
Alameda, Cal.

Sir:

Having spent 15 years in trade paper editing, may I commend you on an excellent remodelling job done promptly. The last quarter century has now been picked up.

JERRY SINGLETON
Asst. Manager
Pressed Metal Institute
Cleveland

Sir:

Please register my vote as being very much in favor of arranging your magazine in the old style.

D. S. KLIPPERT
Asst. General Manager of Sales
Timken Roller Bearing Co.
Canton, Ohio

Sir:

Congratulations on the improvement you have made in the arrangement of material in the new IRON AGE. I particularly like the new spot of the Table of Contents on p 2.

C. W. HAMILTON
Executive Office
Sheffield Corp.
Dayton

Sir:

The new setup is more convenient and readable, and I was able more easily to get to the news and special articles.

JOSEPH A. SISTO
Chairman
Barium Steel Corp.
New York

Sir:

We do not read IRON AGE as religiously as perhaps others do, but we do find the time to look it over and

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Higher Speed You can handle more turnover in a given space, or a fixed turnover in less space, with a Northern Electric Overhead Traveling Crane. Desired higher operating speeds are available through various combinations of bridge, trolley, and hoist travel speeds.

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Visibility Safer, better, faster load handling and stacking is possible because the operator has better visibility from the Northern Clear Vision Control Cab.

Low Cost Operation Northern Magnet Handling, Electric Overhead Traveling Cranes cost less to operate—have oil bath lubrication which eliminates necessity for daily lubrication and crane idle time—have fewer parts to wear out, fail, or replace.

When you investigate, ask for Bulletin No. 141-C.

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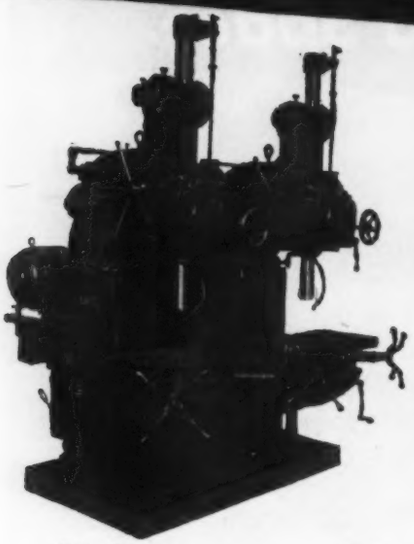
FOR BETTER COOLANT SYSTEMS



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Consolidated Machine
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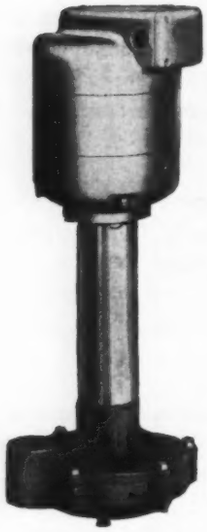
Your coolant system is no better than the pump which controls it. That is why you should specify Ruthman Gusher Coolant Pumps. Ruthman Pumps give you patented advantages found on no other coolant pump. They are dynamically balanced for longer life, give you instantaneous coolant flow, consume less power when throttled. For better performance specify Ruthman Gusher Coolant Pumps on all your metal-working machinery.



Illustrated is a Colburn #6 Two Spindle Manufacturing Type Heavy Duty Drill Press, built by Consolidated Machine Tool Corp. and equipped with Model YLO-7160 1/4 H.P. Gusher Pump.

THE RUTHMAN MACHINERY CO.

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DEAR EDITOR

Continued

can say that we like the new arrangement.

D. R. WEEDON
Asst. Manager
Blanchard Machine Co.
Cambridge, Mass.

Sir:

Maybe after habituation I will find it easier to get around in the new IRON AGE.

HERBET W. GRAHAM
Vice-president
Jones & Laughlin Steel Corp.
Pittsburgh

Sir:

I like the new layout very much since it greatly simplifies the location of my favorite sections. I feel confident that your other readers will be similarly impressed with the many improvements that you and your staff have made.

C. R. MAXON
Market Development Div.
New Jersey Zinc Co.
New York

Sir:

Congratulations on your new layout. I like the editorial matter with the new index and masthead where it belongs. A fine job.

ALAN BROWN
Advertising Manager
Bryant Chucking Grinder Co.
Springfield, Vt.

Sir:

Personally, I like the way the new IRON AGE is set up, and it appears as though the type is larger and easier to read. Overall it is a good job.

JAMES A. ROEMER
President
Niles Rolling Mill Co.
Niles, Ohio

Sir:

It's such a great improvement over all the past issues that I'm still gasping for breath at your audacity.

FRANCES JURASCHEK
Manager, Commercial Research Div.
Carnegie-Illinois Steel Corp.
Pittsburgh

Sir:

Congratulations on the new look. I like the new type, new arrangement, and pictures of the contributors. The magazine is easier to read and the change is all for the good.

RICHARD W. SMITH
Asst. Manager, Natural Resources Dept.
U. S. Chamber of Commerce
Washington

Sir:

I think the changes which have been made are all good ones; however, after reading your magazine every week for a great many years, it will probably take a little while to get accustomed to the new format.

GEORGE E. TOTTEN
Sales Manager, Tin Plate Div.
Carnegie-Illinois Steel Corp.
Pittsburgh

Plant Resumes Operations

Buffalo—The American Radiator & Standard Sanitary Corp. resumed production at its Bond plant on a reduced scale Aug. 15, and many workers who were laid off when the plant suspended July 1 will be recalled gradually. About 700 workers were laid off at that time, while about 250 employees, including supervisory and maintenance personnel and some pattern makers and shipping department workers continued to work. Many employees took vacations during the shutdown.

Phillips B. White, plant manager, said operations of the plant's two foundries will be revived first and production in other departments will be restored as castings become available.

One of the principal reasons for the production halt was a large inventory of boiler products in the plant's warehouse

Army Awards Contracts

Washington—Included in recent major contracts awarded by the Army Dept. were: General Motors, Chevrolet Div., $3,203,110 for passenger cars and $349,993 for light trucks; Ford Motor Co., $152,150 for engines equipped with starters and clutch; and Standard Machine Products Co., $184,282 for gears and parts.

Other major contracts included Columbia Machinery & Engineering, crane shovel, $865,204; Barber-Greene Co., drag conveyers, $202,289; Service Caster & Truck Corp., fork trucks, $528,322; and, Russokov Can Co., drums, $767,812.

Symington-Gould Net Declines

Depew, N. Y.—Symington-Gould Corp. reported for the quarter ended June 30 net income of $214,248, equal to 21¢ a share, compared with $250,116, or 24½¢ a share, in the preceding quarter, and $269,776, or 26½¢ a share, in the second quarter of 1948.

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